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Final Environmental Impact Statement

Use of Domestic Sheep, Goats, and Pack Goats

Shoshone National Forest
Wyoming

Shoshone National Forest Land Management Plan Revision
Final Environmental Impact Statement
Fremont, Hot Springs, Park, Sublette, and Teton Counties, Wyoming

Lead Agency:	**USDA Forest Service**
Cooperating Agencies:	**Wyoming Game and Fish Department**
Responsible Official:	**BRIAN FEREBEE, REGIONAL FORESTER** **Rocky Mountain Region** **1617 Cole Boulevard, Building 17** **Lakewood, Colorado 80401**
For Information Contact:	**CASEY MCQUISTON, RESOURCES STAFF OFFICER** **Shoshone National Forest** **808 Meadow Lane Avenue** **Cody, Wyoming 82414** **(307) 578-5134**

Abstract: This Final Environmental Impact Statement (FEIS) documents the analysis of four alternatives developed for managing the potential risk of disease transmission to bighorn sheep from domestic sheep and goats, and pack goats. The Forest Service identified Alternative 3b as the preferred alternative.

The announcement of the release of this FEIS and Draft Record of Decision (ROD) will be published in the Federal Register. This will be followed by a 60-day objection period.

Summary

The Shoshone National Forest proposes to limit areas where domestic sheep allotments are stocked and restrict the use of domestic goats and pack goats on the Forest to reduce the risk of disease transmission to bighorn sheep. The area affected by the proposal includes core native bighorn sheep habitat across the Shoshone. This action is needed because of the potential impacts to core native bighorn sheep herds.

On May 6, 2015, the Rocky Mountain Regional Forester signed the Record of Decision (ROD) revising the Shoshone National Forest Land Management Plan (LMP). The May 6, 2015 Revised LMP included standards and guidelines restricting the use of recreational pack goats, and domestic sheep and goat grazing, where it was determined that there was unacceptable risk of disease transmission from the pack goats or domestic sheep and goats to bighorn sheep. Bighorn sheep are a sensitive species for the Shoshone National Forest.

In June 2015, the North American Packgoat Association joined with the Idaho Wool Growers Association and filed a Motion for Contempt with the U.S. District Court for the District of Idaho. Plaintiff's alleged the Forest Service improperly relied on a report that the Court had previously found to be in violation of the Federal Advisory Committee Act (FACA) when the Shoshone National Forest prepared its 2012 and 2013 Risk Assessment of Disease Transmission (RADT) report, which the Forest relied upon for revising the LMP.

In February 2016, the District Court granted the plaintiffs motion for contempt. On July 9, 2016, the parties agreed to a stipulated settlement. In accordance with the July 2016 Stipulated Settlement Agreement, the Regional Forester has prepared a new RADT report and Final Environmental Impact Statement consistent with the National Environmental Policy Act and all applicable laws and regulations that analyze the potential for disease transmission between domestic sheep, domestic goats and pack goats, and wild bighorn sheep on the Shoshone National Forest.

These issues led the agency to develop three alternatives to the proposed action:

- Alternative 1, No Action: Domestic sheep grazing would be allowed on the current allotments allocated for sheep, and pack goat use would be allowed on the Shoshone National Forest.
- Alternative 2, Proposed Action: Domestic sheep grazing would be allowed on the current allotments allocated for sheep. Pack goat use would be prohibited from core native bighorn sheep ranges.
- Alternative 3. Domestic sheep grazing would be allowed on the current allotments allocated for sheep and goats.
  Pack goat use would be allowed in all core native bighorn sheep ranges under a permit system that incorporates the mitigation measures identified in the description of the alternative.

Alternative 3b is a combination of alternative 2 and 3. Under Alt 3B domestic sheep grazing would be allowed on the current allotments for sheep. Pack goat use would be prohibited in occupied core native bighorn sheep habitat. Pack goat use could be

authorized under a permit system with specific requirements in specific areas outside occupied core native bighorn sheep habitat identified in items 10, 11 and 12 in the description of this alternative. **Major conclusions:**

Based upon the effects of the alternatives, the responsible official will decide how to address the potential risk of disease transmission from domestic sheep and goats, and pack goats, to bighorn sheep.

Acronyms and Abbreviations

AUM – Animal Unit Month
BLM – Bureau of Land Management
CEQ – Council on Environmental Quality
CFR – Code of Federal Regulations
SDEIS – Supplemental Draft Environmental Impact Statement
EIS – Environmental Impact Statement
FACA – Federal Advisory Committee Act
FEIS – Final Environmental Impact Statement
LMP – Land Management Plan
NEPA – National Environmental Policy Act
RADT – Risk Assessment of Disease Transmission
ROD – Record of Decision
SEIS – Supplemental Environmental Impact Statement
SENS – Sensitive Species
WGFD – Wyoming Game and Fish Department

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Chapter 1. Purpose of and Need for Action

Document Structure

The Forest Service has prepared this Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This EIS discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four chapters:

- *Chapter 1. Purpose and Need for Action:* The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Chapter 2. Alternatives, including the Proposed Action:* This chapter provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Chapter 3. Affected Environment and Environmental Consequences*: This chapter describes the environmental effects of implementing the proposed action and other alternatives.
- *Chapter 4. Consultation and Coordination:* This chapter provides a list of preparers and agencies consulted during the development of the EIS.

Additional documentation may be found in the project planning record located at Shoshone National Forest Supervisor's Office in Cody, Wyoming.

Background

On May 6, 2015, the Rocky Mountain Regional Forester signed the Record of Decision (ROD) revising the Shoshone National Forest Land Management Plan (LMP). The May 6, 2015 Revised LMP included standards and guidelines restricting the use of recreational pack goats, and domestic sheep and goat grazing, where it was determined that there was unacceptable risk of disease transmission from the pack goats or domestic sheep to bighorn sheep. Bighorn sheep are a sensitive species for the Shoshone National Forest.

In June 2015, the North American Packgoat Association joined with the Idaho Wool Growers Association and filed a Motion for Contempt with the U.S. District Court for the District of Idaho, alleging the Forest Service improperly relied on a report that the Court had previously found to be in violation of the Federal Advisory Committee Act (FACA) when the Shoshone National Forest prepared its 2012 and 2013 Risk Assessment of Disease Transmission (RADT) report, which the Forest relied upon in revising the LMP.

The Idaho District Court's 2009 Decision prohibited the Forest Service from relying on the findings and conclusions of two Payette National Forest reports that pertained to disease transmission between domestic sheep and bighorn sheep on the Payette.

In February 2016, the District Court granted plaintiffs motion for contempt. On July 9, 2016, the parties agreed to a stipulated settlement, including the following:

- Defendants shall retract the Shoshone 2012 and 2013 RADT reports that were prepared for the 2015 Shoshone LMP revision and all references to the Shoshone RADT reports in the administrative record for the Shoshone LMP revision.
- Defendants shall retract the findings and conclusions concerning disease transmission between domestic sheep, domestic goats, and pack goats and wild bighorn sheep that relied on the Shoshone 2012 or 2013 RADT reports, the Payette National Forest's 2006 RADT report, and the Payette Principles report from the 2015 revised Shoshone LMP, the ROD for the Shoshone LMP revision, and the final EIS for the Shoshone LMP revision and the administrative record for the Shoshone LMP revision.
- Defendants shall prepare a Supplement to the EIS (Supplemental EIS, or SEIS) and new RADT report consistent with NEPA and all applicable laws and regulations for the revision of the Shoshone LMP that analyzes the potential for disease transmission between domestic sheep, domestic goats, and pack goats, and wild bighorn sheep on the Shoshone National Forest. The SEIS shall consider whether there are differences in the potential for disease transmission by domestic sheep, domestic goats, and pack goats to wild bighorn sheep. On the basis of the SEIS and new RADT report, Defendants shall issue a Supplemental ROD addressing the potential for disease transmission between domestic sheep, domestic goats, and pack goats, and wild bighorn sheep on the Shoshone National Forest.
- Defendants shall initiate the SEIS and new RADT report by June 30, 2016, and shall use their best efforts to complete the SEIS within fourteen (14) months, by August 30, 2017.
- Nothing in this Agreement shall be construed to prohibit the Forest Service from banning domestic sheep, domestic goats, and pack goats on the Wapiti, Clarks Fork, Greybull, and Wind River Ranger Districts located on the Shoshone National Forest, consistent with previously issued closure orders, pending completion of the SEIS and Supplemental ROD.

Purpose and Need for Action

In accordance with the July 2016 Stipulated Settlement Agreement, the direction restricting pack goat use contained in the May 2015 Revised Forest Plan has been retracted. Accordingly, the Forest Service must consider whether the revised Forest Plan should include direction regarding management of domestic sheep and goats to limit potential for disease transmission to bighorn sheep, and, if so, whether there are differences in the potential for disease transmission from domestic sheep, domestic goats, or pack goats, to wild bighorn sheep that warrant different management approaches.

Therefore, the purpose of and need for the proposed Federal action being considered here is to determine what, if any, use by domestic sheep, domestic goats, or pack goats is

appropriate within the Shoshone National Forest by analyzing the risk of disease transmission from domestic sheep, domestic goats, and pack goats to bighorn sheep, and to determine what, if any, direction should be included in the revised Forest Plan.

This final EIS was prepared independently and did not rely on the 2009 Payette reports or the 2012 or 2013 Shoshone RADT reports. This SEIS relies on the best available science regarding the risk of disease transmission between domestic sheep, domestic goats and pack goats, and bighorn sheep.

This analysis is supplemental to and part of the analysis for the 2015 Revised Forest Plan decision, which was governed by the transition language of the planning regulations at 36 CFR 219.17(b)(3), which permitted use of a previous version of the regulations, issued in 1982, for forest plan revisions initiated prior to 2012. The 1982 version of the planning regulations is available on the Forest Service website.

Proposed Action

The Rocky Mountain Regional Forester proposes to limit areas where domestic sheep allotments are stocked, restrict the use of domestic goats, and restrict the use of domestic goats and pack goats on the Shoshone National Forest in order to reduce the risk of disease transmission to bighorn sheep.. These restrictions would be incorporated into the LMP through the following plan components:

Desired Condition – Maintain healthy core native bighorn sheep herds by minimizing the risk of potential disease transmission from domestic sheep, domestic goats, and pack goats.

SENS-Goal-03 – Maintain lowest possible risk of disease transmission from domestic sheep, domestic goats, and pack goats to wild bighorn sheep within core bighorn sheep ranges.

SENS-Standard-05 – Domestic sheep and goat allotments shall not overlap with core native bighorn sheep ranges.

SENS-Standard-06 – Recreational pack goat use in core native bighorn sheep ranges is prohibited.

SENS-Guideline-12 – Outfitter and guide authorizations for recreational goat packing in core bighorn sheep ranges will not be issued.

Management Approach – A wildlife program emphasis for bighorn sheep is to reduce the risk of disease transmission from domestic sheep and goats to bighorn sheep. There is a concern about the risk of disease transmission to bighorn sheep from domestic goats used for packing. To minimize that risk, guidelines are applied for domestic pack goats within the Shoshone National Forest; domestic sheep and goat grazing has been removed from core native bighorn sheep ranges. Authorizations for pack goat use in core bighorn sheep ranges will not be issued.

Decision Framework

Given the purpose and need, the deciding official reviews the proposed action, the other alternatives, and the environmental consequences in order to make the following decisions:

Whether to restrict the use of domestic sheep, domestic goats, and pack goats in bighorn sheep habitat on the Shoshone National Forest and what plan components to include in the revised LMP based on what is necessary and appropriate to minimize the risk of contact and disease transmission from domestic sheep, domestic goats, and pack goats to bighorn sheep.

Public Involvement

A Notice of Intent to prepare a supplemental EIS in the Federal Register on March 31, 2017. No additional public meetings have been held during the preparation of the SDEIS due to the extensive public participation process that occurred with the development of the May 2015 Forest Plan. During the 90-day comment period on the Draft Forest Plan and DEIS that occurred in 2012, the Forest received about 23,480 letters, including letters for and against the limitations on recreational pack goat use. During the 90-day comment period on the SDEIS the Forest received 53 comment letters.

Issues

The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…" As for significant issues, the Forest Service identified the following issues raised by interested parties during Forest Plan revision and during the SDEIS comment period:

1. There is potential for disease transmission from domestic sheep, domestic goats, and pack goats to wild bighorn sheep.
2. There are differences in the potential for disease transmission by domestic sheep, domestic goats, or pack goats to bighorn sheep.
3. There are minimal options for reducing potential for contact and disease transmission.
4. Contact between bighorn sheep and domestic sheep, domestic goats, and pack goats increases the risk of disease transmission to bighorn sheep.

Chapter 2. Alternatives, including the Proposed Action

Introduction

This chapter describes and compares the alternatives considered for the management of domestic sheep, domestic goats, and pack goats to minimize the potential risk of disease transmission to bighorn sheep on the Shoshone National Forest. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative (i.e., prohibition on pack goat use versus permitted use of pack goats based on implementation of mitigation measures) and some of the information is based upon the environmental, social, and economic effects of implementing each alternative (i.e., the risk of disease transmission under a prohibition on pack goat use versus permitted use).

This document uses several terms to define bighorn sheep occurrence. Bighorn sheep herd units are defined by the Wyoming Game & Fish Department using broad-scale delineations to identify different herds for management purposes. Core native bighorn sheep ranges is another term used for herd units that were delineated for core native bighorn sheep herds. Occupied habitat is a more refined depiction of habitat used by bighorn sheep within the herd unit boundary. Occupied habitat is identified by WGFD based on bighorn sheep location data and other local knowledge. Both occupied and unoccupied bighorn sheep habitat are included within herd unit boundaries. Figure 1 depicts bighorn sheep herd unit boundaries relative to occupied habitat.

Alternatives Considered in Detail

The Forest Service developed three alternatives, including the No Action, the Proposed Action, and an Adaptive Management alternative.

1. No Action: Domestic sheep grazing would be allowed on the current allotments allocated for sheep, and pack goat use would be allowed on the Shoshone.
2. Proposed Action: Domestic sheep grazing would be allowed on the current allotments allocated for sheep. Pack goat use would be prohibited within core native bighorn sheep herd units. See Figure 3 in Appendix A.
3. Alternative 3. Domestic sheep grazing would be allowed on the current allotments allocated for sheep and goats.
   Pack goat use would be allowed in all core native bighorn sheep ranges under a permit system that incorporates the mitigation measures identified in the description of the alternative.
4. Alternative 3b is a combination of alternative 2 and 3. Under Alt 3B domestic sheep grazing would be allowed on the current allotments for sheep. Pack goat

use would be prohibited in occupied core native bighorn sheep habitat. Pack goat use could be authorized under a permit system with specific requirements in specific areas outside occupied core native bighorn sheep habitat identified in items 10, 11 and 12 in the description of this alternative. See Figure 4 in Appendix A.

Alternative 1: No Action

Under the No Action alternative, current management plans would continue with no additional restrictions on domestic sheep, domestic goats, and pack goats. There would be no restrictions contained in the forest plan regarding domestic sheep, domestic goats, and pack goats in core native bighorn sheep habitat. Any existing closure orders regarding pack goat use would be rescinded.

Alternative 2: Proposed Action

The Shoshone National Forest proposes to limit areas where domestic sheep allotments are stocked and restrict the use of domestic goats and pack goats on the Shoshone National Forest in order to reduce the risk of contact and potential for disease transmission to bighorn sheep.

Restrictions on domestic sheep, goats and pack goats would be incorporated into the LMP through the following plan components:

Desired Condition– Low risk of disease transmission from domestic sheep and/or goats within the Shoshone National Forest. Use by domestic sheep, domestic goats, and pack goats will not be authorized in areas that overlap with bighorn sheep so as to reduce the risk of disease transmission.

SENS-Goal-03 – Maintain lowest possible risk of disease transmission from domestic sheep and domestic goats to wild bighorn sheep within core native bighorn sheep ranges.

SENS-Standard-05 – Domestic sheep and goat allotments shall not overlap with core native bighorn sheep ranges.

SENS-Standard-06 – Recreational pack goat use in core native bighorn sheep ranges is prohibited.

SENS-Guideline-12 – Outfitter and guide authorizations for recreational goat packing in core native bighorn sheep ranges will not be issued.

Management Approach – A wildlife program emphasis for bighorn sheep is to reduce the risk of disease transmission from domestic sheep and goats to bighorn sheep. To minimize that risk, standards and guidelines are applied to restrict domestic pack goats within the Shoshone National Forest; domestic sheep and goat grazing has been removed from core native bighorn sheep ranges. Authorizations for pack goat use in core bighorn sheep ranges will not be issued.

There is no proposed change to domestic sheep and domestic goat grazing allotments because there are no domestic sheep or goat allotments located within the core native bighorn sheep ranges on the Shoshone National Forest.

Alternative 3: Pack Goat Use with Mitigations

This alternative would be similar to Alternative 1 but includes an adaptive management measure to authorize the use of pack goats under certain conditions. The plan components described in Alternative 2 would also be addressed in Alternative 3 and incorporated through the implementation of mitigation measures. This alternative also considered mitigation measures proposed by the North American Pack Goat Association to provide for separation between pack goats and bighorn sheep and reduce the risk of disease transmission (Jennings 2011).

Domestic sheep grazing would be allowed on the current allotments allocated for sheep. Pack goat use would be allowed in all core native bighorn sheep ranges under a permit system that incorporates the mitigations measures identified below.

Those conditions would include:

1. Implementing a system that would require a permit for all pack goat use. Pack goat users would be informed on required and recommended actions for reducing the risk of contact between pack goats and bighorn sheep when obtaining their permit.
2. Requiring any observed contact between pack goats and bighorn sheep, as well as any lost pack goats, to be reported to the Forest Service as soon as possible as a condition of obtaining a pack goat use permit.
3. Limiting the number of pack goats per party.
4. Requiring pack goats to be leashed or in direct control by their owners.
5. Requiring pack goats to be high-lined or restrained in campsites.
6. Requiring pack goats to have bells attached to their collars at all times.
7. Requiring veterinary health inspection and disease testing of all pack goats before entering Shoshone National Forest lands, and requiring handlers to be in possession of a health and disease testing certificate for each pack goat.

Additional mitigation measures were provided by the North American Pack Goat Association, but were not considered in this alterative because they were not feasible to implement. A discussion of these additional measures is available in the project record. The Forest Service and Wyoming Game and Fish Department would review emerging science and technologies on a biannual basis or when new information is provided by the public. Adoption of a permit system would be an adaptive management change as contemplated under 36 CFR §§ 220.3, 220.5(e)(2).

Alternative 3b: Pack Goat Use with Mitigations Outside Occupied Core Native Bighorn Sheep Habitat

Alternative 3b was developed between the draft and final EIS in response to internal and public feedback during the comment period and has been approved by the Responsible Official. Alternative 3b is a combination of Alternatives 2 and 3. Under this alternative domestic sheep grazing would be allowed on the current allotments allocated for domestic sheep. Pack goat use would be prohibited in occupied core native bighorn sheep

habitat. Pack goat use could be authorized under a permit system in specific areas outside occupied core native bighorn sheep habitat identified in items 10, 11 and 12 below and in Figure 4 of Appendix A. Permits would be approved when specific condition are met. Those conditions would include:

1. A permit for all pack goat use will be required. The permit will identify the required and recommended actions for reducing the risk of contact and potential for disease transmission between pack goats and bighorn sheep.
2. Permits will require the permit holder to report to the Forest Service any observed contact between pack goats and bighorn sheep, as well as any lost pack goats as soon as possible.
3. Permits will limit the number of pack goats to three per person and a maximum of 12 pack goats per party.
4. Permits will require pack goats to be leashed or in direct physical control by their owners at all times while on the Shoshone National Forest.
5. Permits will require pack goats to be high-lined or restrained in campsites while on the Shoshone National Forest.
6. Permits will require pack goats to have bells attached to their collars at all times while on the Shoshone National Forest.
7. The permit will require each pack goat to be uniquely identified by, but not limited to: ear tags, tattoos, collar tags when on the Shoshone National Forest.
8. In order to obtain a permit for pack goat use on the Shoshone National Forest, the requester must present documentation of veterinary health inspection and disease testing of all pack goats before entering Shoshone National Forest lands. The permit will require pack goat handlers to be in possession of a health and disease testing certificate for each pack goat while on the Shoshone National Forest. Inspection and testing protocol will be based on best available science and could change as new science becomes available. Testing requirements will be identified on the Shoshone National Forest website.
9. Permitted pack goat use will be limited to May 31 through October 31 of each year.
10. Pack goat use may be authorized through a permit system on a portion of the Clarks Fork District. The area for pack goat use is limited to the area north of the Clarks Fork Yellowstone River to the crossing of the Beartooth Highway / U.S. Highway 212, thereafter north of the Beartooth Highway / U.S. Highway 212 and west of Canyon Creek and Sawtooth Lake to the crossing of the Morrison Road / Forest Road 120, thereafter west of the Morrison Road / Forest Road 120 to the intersection of the Beartooth Highway / U.S. Highway 212 and thereafter west of the Beartooth Highlakes Trail / Forest Trail 620 (Figure XYZ).
11. Pack goat use may be authorized through a permit system on a portion of the Washakie District. The area for pack goat use is limited the area south of the Main Fork of Bull Lake Creek and the Fortress (Figure XYZ).

12. Pack goat use may be authorized through a permit system on a portion of the Wind River District. Pack goat use is limited to the area south of U.S. Highway 26 and west of the Union Pass Road /Forest Road 263 (Figure XYZ).

Additionally, the Shoshone National Forest will review Wyoming Game and Fish Department (WGFD) occupied core native bighorn sheep habitat data as information is provided by the WGFD to the Shoshone National Forest. Based on information provided by the WGFD, the Shoshone National Forest may adjust the boundaries of those areas available for pack goat use to ensure spatial and temporal separation of pack goats and occupied habitat for core native bighorn sheep herds. Based on this data, the Shoshone National Forest may permanently or temporarily adjust areas available for pack goat use.

Additional mitigation measures were provided by the North American Pack Goat Association but were not considered in this alterative because they were not feasible to implement. A discussion of these additional measures is available in the project record. The Forest Service and WGFD would review emerging science and technologies on a biannual basis or when new information is provided by the public. Adoption of a permit system would be an adaptive management change as contemplated under 36 CFR §§ 220.3, 220.5(e)(2).

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14).

This analysis is narrowly focused on a single topic and is a supplement to the original EIS for the Shoshone National Forest Land Management Plan Revision. An alternative was submitted by a collaborative group made up of representatives from the North American Packgoat Association, Wyoming Wild Sheep Foundation, Bighorn Restoration Group and Wyoming Game and Fish Department. The alternative recommends prohibiting use of pack goats within occupied core native bighorn sheep habitat on the Shoshone National Forest while authorizing pack goat use outside occupied core native bighorn sheep habitat under the following conditions:

1. Implementing a permit system for pack goat use. Pack goat users would be informed on required and recommended actions for reducing risk of contact between pack goats and bighorn sheep when obtaining a permit.
2. Requiring any observed contact between pack goats and bighorn sheep, as well as any lost pack goats, to be reported to the Forest Service as soon as possible.
3. Limiting the number of pack goats per party.
4. Requiring pack goats to be leashed or in direct control of their owner.
5. Requiring pack goats to be high-lined or restrained in campsites.
6. Requiring pack goats to have bells attached to their collars.

7. Requiring pack goats to undergo disease testing and health inspection prior to use on the Shoshone National Forest.
8. Limiting pack goat use to May 31 through October 31 of each year.
9. Restricting pack goat use on the Washakie Ranger District to the area south of the Main Fork of Bull Lake Creek originating at the Alpine Lakes south of the Brown Cliffs. (See Map *map included in **054IrvineEtAl02.pdf**).
10. Pack goat users would voluntarily avoid use outside occupied core native bighorn sheep habitat on the Clarks Fork, Wapiti, Greybull, and Wind River Districts to avoid potential grizzly bear conflicts.

The alternative was not analyzed in detail because it falls within the range of alternatives already considered in detail. However, Alternative 3b was subsequently developed based on this alternative, as well as comments and feedback received on the SDEIS.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives are compared in Table 1.

Table 1. Comparison of alternatives

	Alternative 1	Alternative 2	Alternative 3	Alternative 3b
Management of permitted domestic sheep and goats and recreation pack goat use on bighorn sheep habitat.	Domestic goats and pack goats allowed on entire Shoshone National Forest. Livestock allotments closed to domestic sheep grazing in core native bighorn sheep habitat.	No domestic goats or pack goats allowed in core native bighorn sheep herd units. Livestock allotments closed to domestic sheep grazing in core native bighorn sheep habitat.	Pack goats allowed in core native bighorn sheep habitat under permit system. Livestock allotments closed to domestic sheep grazing in core native bighorn sheep habitat.	Pack goats allowed outside occupied core native bighorn sheep habitat under permit system. Livestock allotments closed to domestic sheep grazing in core native bighorn sheep habitat.
Number of core native bighorn sheep herds potentially at risk of disease transmission	6	0	6	0
Numbers of acres available for use of pack goats	Approx. 2.4 million acres (forest-wide)	247,523 within the Washakie District outside the Fitzpatrick Wilderness area	Approx. 2.4 Million acres (forest-wide)	398,586 acres outside core native bighorn sheep habitat

Chapter 3. Affected Environment and Environmental Consequences

This chapter summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in the alternatives chapter.

Rocky Mountain Bighorn Sheep

Affected Environment

Bighorn sheep were once one of the most abundant wild ungulates in the West. Population estimates range from 1.5 million to 2 million at the onset of the 19th century (Lawrence et al. 2010, WAFWA 2012). Populations declined with the westward expansion of human populations due to overhunting, introduction of domestic sheep and goats, and overgrazing of rangelands. Bighorn populations began to decline dramatically in most areas about 1880. By 1900, many populations were eliminated (Buechner 1960). Disease contributed to the decline of bighorn sheep populations (Beecham et al. 2007, CAST 2008), and many native herds declined to less than 10% of their historical size. According to historical accounts, such declines coincided with the advent of domestic livestock grazing on ranges occupied by bighorn sheep (Grinnell 1928, Schillinger 1937, CAST 2008). Epizootics among native bighorn herds were reported in various locations following European settlement and establishment of domestic livestock grazing, with reports from Colorado as early as 1885 (Coggins 2010).

Rocky Mountain bighorn sheep are native to Wyoming and, historically, bighorns ranged across most of the state within suitable habitat. The Shoshone National Forest has the largest number of bighorn sheep of any National Forest within National Forest System lands, with about 4,550 of the 6,000 bighorn sheep in Wyoming (using 2016 estimates). The Shoshone National Forest is occupied by six of the eight core native bighorn sheep herds in Wyoming. These are herds that have never been extirpated and re-populated with transplanted bighorn sheep (Wyoming State-wide Bighorn/Domestic Sheep Interaction Working Group 2004a). They are the largest and most robust bighorn sheep populations in Wyoming and are the highest priorities for bighorn sheep management in Wyoming (Wyoming State-wide Bighorn/Domestic Sheep Interaction Working Group 2004a). Core native herds on the Shoshone National Forest include: Clarks Fork, Trout Peak, Wapiti Ridge, Younts Peak, Francs Peak, and Whiskey Mountain (Figure 1). These core herds currently occupy 67% (1.65 million acres) of the Shoshone National Forest. Five of the six core native herds are connected to one another (Whiskey Mountain being the exception), and together form the Absaroka metapopulation.

A small portion of the Washakie Ranger District is occupied by the Temple Peak herd. This is not a core native herd, but is classified as both a remnant and a transplant herd. It is managed within a “cooperative review area” (Wyoming State-wide Bighorn/Domestic Sheep Interaction Working Group 2004b), which consists of areas of suitable bighorn sheep range where proposed changes in bighorn sheep management or domestic sheep

use will be cooperatively evaluated. Bighorn sheep in these areas have lower priority for management by WGFD than core native herds (Wyoming State-wide Bighorn/Domestic Sheep Interaction Working Group 2004b).

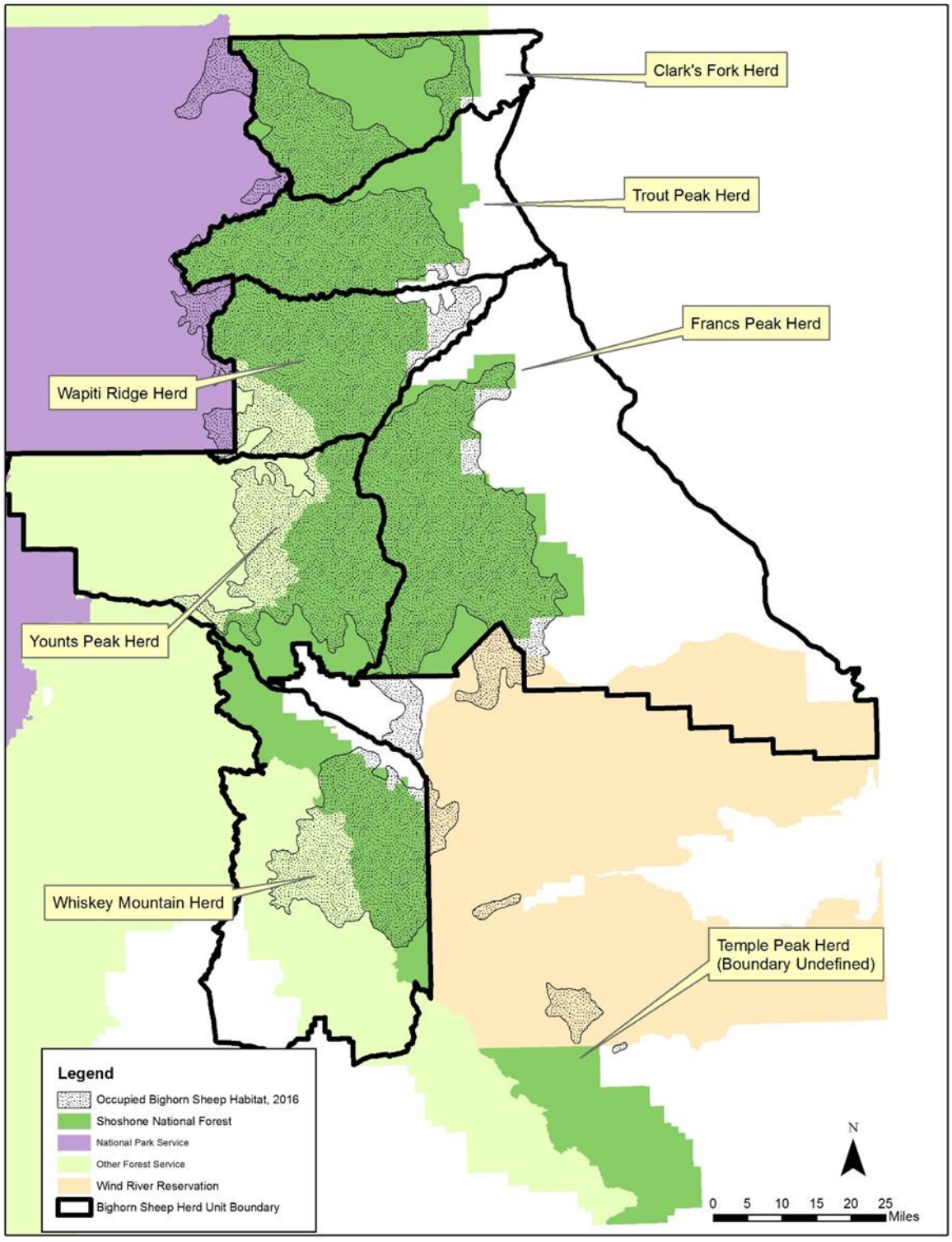

Figure 1. Bighorn sheep herds and occupied habitat on the Shoshone National Forest and adjacent lands

Clarks Fork Bighorn Sheep Herd

The Clarks Fork bighorn herd is a core native herd and occupies mostly Shoshone National Forest (SNF) lands in the Absaroka Range and Beartooth Mountains, with smaller portions found on adjacent areas of Yellowstone National Park and the Custer Gallatin National Forest. Population data for this herd are provided in Table 2. In recent years, this herd has been at or above management objectives, with good recruitment (WGFD 2017*a*).

No domestic sheep grazing occurs within this herd unit. The closest domestic sheep/goat grazing on the SNF is about 240 km (150 miles) south of the Clarks Fork herd (Table 3). No pack goat use is known to occur within this core native herd range.

Trout Peak Bighorn Sheep Herd

This core native herd occupies portions of the SNF within the Absaroka Range, with a small number also utilizing adjacent portions of Yellowstone National Park. Population data for this herd is provided in Table 2.This herd has been at or slightly below management objectives in recent years (WGFD 2017*a*). No domestic sheep grazing occurs within this herd unit. The closest domestic sheep/goat grazing on the SNF is about 221 km (138 miles) south of the Trout Peak herd. No pack goat use is known to occur within this core native herd range.

Wapiti Ridge Bighorn Sheep Herd

This core native herd occupies portions of the SNF and BTNFs within the Absaroka Range, with a small number also utilizing adjacent portions of Yellowstone National Park. Population data for this herd is provided in Table 2. The population appears to be exhibiting a downward trend in recent years, and is currently below management objectives (WGFD 2017*a*). No domestic sheep grazing occurs within this herd unit. Closest domestic sheep/goat grazing on the SNF is about 179 km (112 miles) south of the Wapiti Ridge herd. No pack goat use is known to occur within this core native herd range.

Younts Peak Bighorn Sheep Herd

This core native herd occupies portions of the SNF and Bridger Teton National Forest (BTNF) within the Absaroka Range. Younts Peak is the most remote bighorn sheep herd in Wyoming **(**Beecham et al. 2007**)**. While much of the Younts Peak herd is non-migratory and resides year-round on high-elevation ridges, portions of this herd do migrate to low-elevation winter range in the South Fork of the Shoshone River valley. The large number of sheep wintering at high elevations make this herd prone to periodic high mortality losses from severe winter weather.

Population data for this herd is provided in Table 2. The population is recovering from high winter mortality during 2010-2013, and is currently near management objectives (WGFD 2017*a*). No domestic sheep grazing occurs within this herd unit. The closest domestic sheep/goat grazing on the SNF is about 137 km (85 miles) southeast of the Younts Peak herd. No pack goat use is known to occur within this core native herd range.

Francs Peak Bighorn Sheep Herd

This core native herd occupies portions of the SNF and the Wind River Indian Reservation within the Absaroka and Owl Creek Ranges. Population data for this herd is provided in Table 2. This herd declined by 40-50% after the winter of 2010-2011 due to mortality associated with winter weather and a possible disease outbreak. The population is now believed to have stabilized or increased slightly but is still well below management objectives (WGFD 2017*a*).

The closest domestic sheep/goat grazing on the SNF is about 113 km (70 miles) south of the Francs Peak herd. No pack goat use is known to occur within this core native herd range.

Whiskey Mountain Bighorn Sheep Herd

This core native herd occupies portions of the SNF and BTNF and the Wind River Indian Reservation within the Wind River Range (Figure 2). Population data for this herd is provided in Table 2. This was once the largest herd in the country, but after a catastrophic all-age die-off from pneumonia in 1991, the population has yet to recover and has been below objective for the past 20 years (WGFD 2017b).

In 2010, WGFD personnel spent a significant amount of time observing sheep in early fall as they arrived on winter range. Many lambs were observed coughing violently and showing symptoms of pneumonia. Eleven sheep were euthanized throughout the fall and examined at the Wyoming State veterinary lab to document the presence of disease. Examinations revealed *Mycoplasma ovipneumoniae* in all the sheep that had been seen coughing violently. It appears likely that persistent, low annual recruitment in this population can be traced to chronic bacterial infection resulting in significant lamb mortality as sheep migrate onto winter range in the fall. Despite low recruitment, the population is growing very slowly and it appears a small increase in lamb recruitment will stabilize this population. However, persistent chronic pneumonia continues to be a problem in this herd (Anderson, WGFD, pers. comm. 2017).

The Whiskey Mountain herd is isolated from other herds on the SNF. The Highway 26 corridor, which is the dividing line between the Whiskey Mountain herd and core native herds to the north, consists of fairly unsuitable bighorn sheep habitat, which limits interchange with the Absaroka metapopulation (Beecham et al. 2007). Furthermore, connectivity between the Whiskey Mountain and Temple Peak herds has not been demonstrated (McWhirter, WGFD, pers. comm. 2017).

No domestic sheep grazing occurs within this herd unit. The closest domestic sheep grazing on the SNF is about 81 km southeast of the Whiskey Mountain herd (Table 3).

Pack goat use is currently prohibited within most of this herd's range. However, as currently written, the closure order still allows pack goat use in the Fitzpatrick Wilderness on the Washakie Ranger District, which encompasses the southern portion of the Whiskey Mountain herd's home range (Appendix A).

In the past, pack goat use occurred on the SNF within the occupied habitat of this core native herd (Table 3). Specific trails (about 38 miles) used by goat packing enthusiasts in the Fitzpatrick Wilderness in the past have been identified (North American Packgoat

Association 2011). About 33 miles of the trails identified are within currently occupied bighorn sheep habitat within the Whiskey Mountain herd range (Table 3). The only pack goat outfitter to operate in this area on the SNF relinquished their permit in 2007.

Temple Peak Bighorn Sheep Herd

The Temple Peak herd is comprised of a remnant herd along with descendants of 188 bighorn sheep transplanted from the nearby Whiskey Mountain Herd from 1960-1987, and an additional 88 transplanted to the Wind River Indian Reservation in 1988 and 1993. These sheep primarily used habitat in Sinks Canyon, North Fork Popo Agie Canyon, Little Popo Agie Canyon, and the South Fork of the Little Wind River. This herd experienced an all-age pneumonia die-off in 1992 and has never recovered (WGFD 2007), although it appears to have increased slightly in recent years. Based on recent observations and GPS collar data from bighorn sheep captured in 2016 and 2017, the current distribution of bighorns includes a small number in the North Fork of the Popo Agie River (Stan Harter, Wyoming Game & Fish Department, personal communication, 8/25/2017), with additional animals from the Wind River Indian Reservation migrating to high elevation summer range in the South Fork of the Little Wind River and Cirque of the Towers (Wyoming Game & Fish Department, unpublished data). Some collared bighorn sheep also remained year-round on the Wind River Indian Reservation. No movement has been document south of the North Fork of the Popo Agie River drainage in recent years. Additionally, connectivity between the Temple Peak and Whiskey Mountain herds has not been established, although recent GPS collar data from bighorn sheep in the Bull Lake Creek drainage indicate this is a possibility.

A home range for this herd has not been defined due to the lack of data. This herd no longer has a hunt area assigned to it and is not discussed in the WGFD Annual Big Game Herd Unit Reports. The Temple Peak herd is not a core native herd; rather, it is a transplanted herd and is designated a “Cooperative Review Area” by the State of Wyoming (Wyoming State-wide Bighorn/Domestic Sheep Interaction Working Group 2004). Cooperative Review Areas contain suitable bighorn sheep range where proposed changes in bighorn sheep management or domestic sheep use will be cooperatively evaluated.

Including animals on the Wind River Indian Reservation, the Temple Peak herd currently consists of about 100 sheep (McWhirter, WGFD, pers. comm. 2017). Cassaigne et al. (2010) suggest that a minimum population of 188 bighorn sheep is required to ensure long-term persistence in the presence of epizootic disease. Therefore, this herd may eventually go extinct. The WGFD is not currently considering supplementations into this herd (McWhirter, WGFD, pers. comm. 2017).

Domestic sheep grazing has occurred on both the SNF and BTNFs within this herd’s historic summer range, but not within currently occupied range. GPS collar data from 2016-2017 show that the closest bighorn sheep occupied habitat is approximately 27 km (17 miles) from the active domestic sheep grazing allotments on the SNF (Stan Harter, Wyoming Game & Fish Department, personal communication, 8/25/2017). Suitable bighorn sheep habitat within the domestic sheep allotments on the SNF is very limited due to its forested nature. In addition, a large portion of the land between the allotments

and the Temple Peak herd's current occupied habitat is forested, which inhibits bighorn sheep forays to these allotments. Pack goat use occurs within the occupied habitat of this cooperative review herd.

Table 2. Population estimates and demographic characteristics of six bighorn sheep populations on the Shoshone National Forest

[Source: WGFD 2017 a, b; –, no official estimate]

Herd	Population Estimate	Population Objective	Lambs per 100 Ewes	2011–2015 Average	Rams per 100 Ewes	2011–2015 Average
Clarks Fork	600	500	21	31	43	31
Trout Peak	680	750	25	28	24	34
Wapiti Ridge	850	1000	31	23	27	28
Younts Peak	875	900	27	25	39	442
Francs Peak	710	1350	20	23	50	56
Whiskey Mountain	841	1350	18	30	47	49
Temple Peak	–	–	–	–	–	–

Table 3. Proximity of bighorn sheep herds on the Shoshone National Forest to closest domestic sheep herd by land ownership and herd status

[km, kilometer; BLM, Bureau of Land Management; >, greater than]

Bighorn Sheep Herd	Proximity to Domestic Sheep on Shoshone National Forest (km)	Proximity to Domestic Sheep on adjacent lands (km)	Land Ownership of Adjacent Lands	Herd Status
Clarks Fork	240	2	Private	Core native herd
Trout Peak	221	19	BLM	Core native herd
Wapiti Ridge	179	29	BLM	Core native herd
Younts Peak	137	42	BLM	Core native herd
Francs Peak	113	33	BLM, Private	Core native herd
Whiskey Mountain	81	>60	Bridger-Teton National Forest	Core native herd
Temple Peak	29	Unknown	Unknown	Cooperative review herd

Risk Factor: Disease Transmission from Contact with Domestic Sheep and Goats

The susceptibility of bighorn sheep to population declines or extirpation due to respiratory diseases (Besser et al. 2012, Cassirer et al. 2013) is the issue of greatest concern for bighorn sheep conservation. The *Risk Analysis of Disease Transmission between Domestic Sheep and Goats and Rocky Mountain Bighorn Sheep* (RADT) (USDA Forest Service 2017a) provides a detailed summary of the current literature regarding disease transmission between bighorn sheep and domestic sheep, domestic goats, and pack goats.

A large body of evidence underscores the risk of disease transmission from domestic sheep (e.g., Foreyt and Jessup 1982, Onderka and Wishart 1984, Jessup 1985, Black et al.1988, Coggins 1988, Festa-Bianchet 1988, Callan et al.1991, Coggins and Matthews 1992, Foreyt 1994, Martin et al. 1996, Coggins 2002, George et al. 2008, Jeffress 2008, Lawrence et al. 2010, Miller et al. 2011, 2012; Besser et al. 2012a, WAFWA 2012) to wild sheep. The literature includes both circumstantial evidence linking bighorn die-offs in the wild to contact with domestic sheep, and controlled experiments where healthy bighorn sheep exposed to domestic sheep subsequently displayed high mortality rates (e.g., Goodson 1982, Foreyt 1989, 1990, 1992a, b, 1994; Foreyt et al. 1994; Onderka et al. 1988; Onderka and Wishart 1988; Garde et al. 2005, Lawrence et al. 2010, Drew et al. 2014).

The RADT discloses that the literature is much less developed for domestic goats. There is very little research specific to pack goats and scientific uncertainty remains on the potential for disease transmission from domestic goats and pack goats to bighorn sheep. The RADT concluded that domestic goats can carry the bacteria that have been identified as playing a primary role in the development of pneumonia in bighorn sheep, and examples were cited where there is evidence for domestic goats transmitting disease to bighorn sheep. However, there is also evidence that domestic goats, and pack goats in particular, present a lower risk of disease transmission to bighorn sheep that could result in catastrophic all age die-offs. Evidence is emerging to suggest that pack goats have a low prevalence of at least one of the primary pathogens involved in the development of pneumonia in bighorn sheep (*Mycoplasma ovipneumoniae)*, and that pathogens transmitted from domestic goats are often less virulent to bighorn sheep than those transmitted by domestic sheep. However, numerous questions remain unresolved regarding the overall potential for disease transmission from pack goats to bighorn sheep.

Direct and Indirect Effects

Methodology

The risk of physical contact between bighorn sheep and a domestic sheep allotment or pack goat use area was given a qualitative rating of “High,” “Moderate,” or “Low” based on factors relating to spatial and temporal separation, along with other considerations such as the frequency of use, number of domestic sheep or goats involved in that use, and other factors related to human control over domestic sheep or goats. Risk of disease transmission with a subsequent bighorn mortality event, however, was not modeled quantitatively. Instead, a qualitative assessment of disease transmission risk was made

considering the risk of contact along with other factors such as disease prevalence, pathogen virulence, and potential for transmission.

A rating of "High" risk indicates that contact between domestic sheep and goats and bighorn sheep is thought to be likely in the immediate future, although disease transmission resulting in a subsequent bighorn mortality event is not assumed to be a certainty. Conversely, if allotments have been operated for many years without evidence of disease transmission, we do not use this observation to infer a lower risk rating. The fact that contact has not been observed, or a bighorn disease event has not been detected, does not imply a lower risk for such events happening in the future. A rating of "High" risk would occur when there is direct overlap between an area of domestic livestock use and occupied bighorn habitat, or when these areas are within 10 miles (17 km) of an allotment there is good bighorn source habitat connectivity for bighorn dispersal.

A rating of "Moderate" risk indicates that physical contact between bighorn and domestic sheep and goats may occur at some point in the future. Factors that reduce the apparent risk of contact could include the presence of towns, the presence of terrain features and/or habitat features that act as barriers to bighorn sheep movement (Schommer and Woolever 2001), and bighorn sheep distribution patterns. A rating of "Moderate" risk could occur when there is no direct overlap between occupied bighorn habitat, these areas are 10 to 21 miles (18 to 35 km) from an allotment, and/or there is fair bighorn source habitat connectivity for bighorn dispersal. It could also occur when there is direct overlap between a pack goat use area and occupied bighorn sheep habitat.

A rating of "Low" risk indicates that physical contact between domestic sheep and goats and bighorn sheep is believed to be unlikely or irregular and unpredictable. A rating of "Low" risk could occur when there is no direct overlap between mapped bighorn range, and these areas are greater than 21 miles (35 km) from an area of domestic livestock use and/or there is poor bighorn source habitat connectivity for bighorn dispersal. It could also occur when there is direct overlap between occupied bighorn sheep habitat and pack goat use areas but mitigation measures are in place to limit the potential for contact, or when unmitigated pack goat use areas are 10-21 miles from occupied bighorn sheep habitat.

Alternative 1: No Action

This alternative would continue to allocate allotments for domestic sheep grazing, which are currently set at 410 AUMs and 15,780 acres. There would be no plan-level changes to sheep grazing. There would be no overlap between domestic sheep allotments and occupied core native bighorn sheep habitat. The risk of contact and disease transmission between domestic sheep from Shoshone National Forest allotments and bighorn sheep would be low for all core native bighorn sheep herds due to the considerable spatial separation (USDA Forest Service 2017a).

Even though the Temple Peak herd is in closer proximity to the existing domestic sheep allotments on the Shoshone National Forest than the core native herds, there is about 27 km of spatial separation. These allotments provide very limited suitable bighorn sheep habitat because they are mostly forested. In addition, there is a high amount of unsuitable

forested landscape between currently occupied habitat for this herd and the two allotments. Furthermore, in recent years bighorn sheep have not been observed south of the North Fork of the Popo Agie River drainage (S. Harter, Wyoming Game & Fish Department, personal communication, 8/25/2017). Domestic sheep grazing in the Pine-Willow sheep allotment is only authorized on the pasture south of Rennecker Peak. This means that not all of the acreage in the two allotments is utilized for domestic sheep grazing, and the area where domestic sheep grazing is authorized is located furthest from where bighorn sheep could occur. All of these factors reduce the current likelihood of bighorn sheep making contact with domestic sheep allotments on the SNF. Therefore the risk of contact from domestic sheep grazing on the SNF is currently "low" for this cooperative review bighorn sheep herd with a low level of disease transmission risk.

Under this alternative, pack goat use could occur within occupied habitat for bighorn sheep, including all the core native bighorn sheep herds and the Temple Peak herd.

Pack goat use is not currently known to have occurred within any of the Absaroka core native bighorn sheep ranges, and the area has generally been characterized by pack goat users as undesirable for pack goat use due to the high densities of large carnivores. However, the Forest Service has had a small number of inquiries in recent years from people potentially interested in using pack goats in these areas, including one request in 2016 from a person interested in using pack goats to support a bighorn sheep hunt. With no prohibition on pack goat use in these areas, it is reasonable to assume that pack goat use would occur on occasion, and this could include situations where there was spatial and temporal overlap between pack goats and occupied bighorn sheep habitat. This assumption was made because there is no data on specifically where pack goat use would occur in this area, and bighorn sheep in the Absaroka metapopulation occupy broad areas of the landscape (Figure 1). The Clark's Fork, Trout Peak, Wapiti Ridge, Younts Peak, and Francs Peak Herds collectively comprise the Absaroka Metapopulation.

Goat packing has regularly occurred within the occupied habitat of the Whiskey Mountain core native herd in the past (Figure 2), but has been prohibited by special order since 2011. A portion of the trails historically used for goat packing in the Fitzpatrick Wilderness are within and adjacent to areas consistently used by bighorn sheep, including rocky escape cover and open alpine meadows (Figure 6 in Appendix A). These trails are in year-round bighorn sheep habitat. There would be spatial and temporal overlap between pack goat use and occupied bighorn sheep habitat for the Whiskey Mountain herd (USDA Forest Service 2017a).

Domestic goat packing would continue to occur within occupied habitat of the Temple Peak cooperative review herd. Portions of trails used for goat packing are within and adjacent to habitat used by bighorn sheep. These trails are in year-long bighorn sheep habitat. Therefore there would be spatial and temporal overlap between goat packing and occupied bighorn sheep habitat.

Considering the evidence for social attraction between bighorn sheep and domestic goats discussed in the RADT (USDA Forest Service 2017a), spatial and temporal overlap could lead to contact between pack goats and bighorn sheep in any of the herds on the SNF. Contact could occur either through bighorn sheep approaching pack goats along the trail or in camps, or from lost pack goats approaching bighorn sheep. The risk of contact

would be moderated by a number of factors including the low frequency of pack goat use expected, human presence typically associated with pack goat use, and the much greater ability of pack goat users to control their animals compared to free ranging domestic animals on a grazing allotment. Pack goat users have greater control over their animals due to the small number of animals generally involved and the high degree of bonding pack goats typically exhibit with their human associates. There would be a "moderate" risk of contact between bighorn and pack goats because contact may occur at some point in the future.(USDA Forest Service 2017a).

If contact were to occur between pack goats and bighorn sheep, there would be relatively low potential for disease transmission resulting in impacts to bighorn sheep herds, but current science suggests the potential for disease transmission between pack goats and bighorn sheep is lower than that expected from domestic sheep. This is based on literature reviewed in the RADT (USDA Forest Service 2017a) demonstrating that domestic goats and pack goats can carry pathogens that have regularly been associated with pneumonia in bighorn sheep and the evidence presented for disease transmission from domestic goats to bighorn sheep. Literature reviewed in the RADT discusses emerging science indicating that domestic goats likely have lower disease transmission potential than domestic sheep, that this potential may be even lower for pack goats, and that pathogens transmitted from domestic goats have typically been less virulent than those transmitted by domestic sheep. However, it also describes the scientific uncertainty that still exists regarding disease dynamics among domestic goats, pack goats, and bighorn sheep.

Alternative 2: Proposed Action

This alternative would maintain the same allocation of domestic sheep grazing as the No Action alternative, and the effects of domestic sheep grazing on bighorn sheep would be the same as was described for alternative 1.

This alternative would prohibit the use of domestic pack goats within core native bighorn sheep herd units because the core native herds are the highest priority for management by the WGFD. There would be no spatial and temporal overlap between domestic pack goats and bighorn sheep within core native herds. For all the core native herds, there would be a "low" risk of contact between pack goats and bighorn sheep and essentially no disease transmission risk, along with very low uncertainty regarding this risk (USDA Forest Service 2017a).

Domestic goat packing would continue to occur within habitat for the Temple Peak herd because bighorn sheep in this cooperative review area are a lower priority for management by the WGFD. The effects to this herd would be the same as those described for the No Action alternative.

Alternative 3: Pack Goat Use with Mitigations

This alternative would maintain the same allocation of domestic sheep grazing as the No Action alternative, and the effects of domestic sheep grazing on bighorn sheep would be the same as was described for alternative 1.

Under this alternative, there would be spatial and temporal overlap between pack goats and occupied bighorn sheep habitat for the six core native bighorn sheep herds and the Temple Peak bighorn sheep herd on the SNF. The mitigation measures would reduce the risk of contact between pack goats and bighorn sheep. Mitigation measure 1 would ensure that pack goat users understood the required and recommended actions for preventing contact between their pack goats and bighorn sheep. It would also help to track pack goat use on the Forest, and provide a mechanism to require reporting of any contact between pack goats and bighorn sheep. Reporting of lost pack goats could facilitate recovery efforts before contact with bighorn sheep occurred, and would help track how often this occurred. However, pack goat users may be disinclined to report contact between their goats and bighorn sheep, or even lost goats, for fear of incurring additional restrictions on their use. Implementation of mitigation measures 3, 4, and 5 would further increase the amount of control users would have over their pack goats and would help reduce the risk of contact between pack goats and bighorn sheep. Limiting the number of pack goats would allow greater control because fewer animals are easier to control. Requiring goats to be leashed together while traveling down the trail and high-lined in campsites would improve control of pack goats, reduce the risk of stray goats, and reduce the risk of contact with bighorn sheep. Pack goats readily bond to their human handlers and have a strong desire to stay with them (Jennings 2011). The use of bells would allow users to track the movements of their goats.

However, users may not always be able to control their pack goats despite implementation of these techniques. Pack goat use occurs in remote, rugged settings where circumstances cannot always be controlled, and pack goats occasionally are lost on the Forest for a variety of reasons such as being scattered by predators or having too many tied on a high-line. Experienced goat packers have recognized that pack goats occasionally become lost, and that even conscientious pack goat users may not always be successful controlling their goats (J. Dirks, email conversation with J. Harper, Forest Service Wildlife Biologist, 2011). Additionally, it is perceived as dangerous to have goats tied together by leads when travelling through difficult terrain, and users typically disconnect them from each other in such settings (Jennings 2011). Uncontrolled or lost goats within bighorn sheep habitat could have direct contact with bighorn sheep.

In addition, the movements of bighorn sheep cannot be controlled. Wild sheep are unpredictable in their movements and could potentially come into contact with pack goats as well as other wild sheep. As discussed earlier in this analysis, bighorn sheep and domestic sheep and goats are socially attracted to each other, which increases the probability that they will make the close contact necessary for disease transmission. This could occur even under a scenario where pack goats were under close control as required by mitigations 4 and 5.

The mitigation measures are expected to reduce the risk of contact between pack goats and bighorn sheep, but not eliminate the risk. Contact between pack goats and bighorn sheep under the requirements of alternative 3 is expected to be irregular and unpredictable. Using the rationale for risk ratings presented in the RADT (USDA Forest Service 2017), the risk of contact between pack goats and bighorn sheep under this alternative would be “low.”

Other mitigation measures would help decrease the potential for disease transmission between pack goats and bighorn sheep, even if contact between the two were to occur. Reporting of any observed contact between pack goats and bighorn sheep would not help prevent disease transmission, but it may facilitate determination of whether disease transmission occurred and promote a rapid management response. Requiring veterinary health inspection and disease testing of pack goats and handler possession of a health certificate for each pack goat entering the Forest would help limit the risk of disease transmission if contact with bighorn sheep were to occur. A veterinary inspection would detect disease in animals showing symptoms of respiratory disease or other infectious conditions such as pink eye and sore mouth. Disease testing using approved protocols could be conducted for pathogens commonly implicated in bighorn die-offs to identify potentially infectious but non-symptomatic animals. However, implementation of this requirement could be difficult. Veterinarians commonly conduct health inspections and disease testing for a variety of domestic animals using standardized protocols to conform to various state or federal regulations. However, disease testing of pack goats would involve specific sampling protocols for a suite of potential pathogens (H. Edwards, WGFD, personal communication 04/20/2017). There is currently a protocol available for pack goat users to test their animals for *M. ovipneumoniae* through the Washington Animal Disease Diagnostic Lab (see https://waddl.vetmed.wsu.edu/), but similar protocols available to pack goat users have not been established for other pathogens of concern. Additionally, there is concern over the efficacy of testing because disease-causing bacteria may be carried by animals that are not shedding them, and testing may not detect the disease in such animals. These same animals may begin shedding the bacteria at a later time, especially if they are subjected to stress (P. Klein, U.S Forest Service, personal communication, 10/2/2017), and could then potentially transmit pathogens to bighorn sheep. There is also the possibility that "certified" animals could come into contact with other livestock after being tested and inspected, and potentially contract pathogens that could be transmitted to bighorn sheep.

To be effective, these measures would depend on the diligence of the pack goat user. Many pack goat users have stated their willingness to comply with any mitigation measures needed to limit the potential for disease transmission from their animals to bighorn sheep. However, some pack goat users have stated that "the restrictive nature of these best management practices will act as a deterrent for those users not willing to submit to the extensive preparation and implementation of these practices" (Jennings 2011). This indicates that some pack goat users will perceive mitigation measures as restrictive and difficult to implement, and that if they deter some users others may simply choose not to comply. Some level of non-compliance would be expected. Compliance checks by the Forest Service would be infrequent due to the very remote and rugged environments that goat packing takes place in.

The overall potential for disease transmission between pack goats and bighorn sheep if contact were to occur would be lower compared to Alternative 1. However, these mitigation measures have not been implemented on the SNF or elsewhere, and there is uncertainty about their ultimate efficacy. As a result, there would still be substantial uncertainty associated with the potential for disease transmission to occur resulting in a bighorn sheep pneumonia die-off.

Alternative 3b: Pack Goat Use with Mitigations Outside Occupied Core Native Bighorn Sheep Habitat.

This alternative would maintain the same allocation of domestic sheep grazing as the No Action alternative, and the effects of domestic sheep grazing on bighorn sheep would be the same as was described for alternative 1.

This alternative would prohibit the use of domestic pack goats within core native bighorn sheep occupied habitat because the core native herds are the highest priority for management by the WGFD. The effects of pack goat use on core native bighorn sheep herds under this alternative would be very similar to those described under Alternative 2. Given that pack goat use would not be allowed within occupied habitat of core native bighorn sheep herds, there would be no spatial and temporal overlap between pack goat use and occupied bighorn sheep habitat for these herds. The RADT (USDA Forest Service 2017a) discussed foray behavior of bighorn sheep, which are highly mobile animals capable of making movements outside their normal ranges. There would be a very small potential for bighorn sheep from core native herds to move outside of mapped occupied habitat and contact pack goats. This potential would be very small because areas outside of occupied habitat are generally not suitable bighorn sheep habitat, and because authorized pack goat use is expected to be low (USDA Forest Service 2017a). Mitigation measures #1-9 in this alternative are very similar to those in Alternative 3, and their effects on risk of the contact between pack goats and bighorn sheep, along with subsequent disease transmission risk if contact were to occur, would be similar to those described under Alternative 3 as well. The mitigation measures would help limit the potential for contact between bighorn sheep and pack goats, along with the resulting potential for disease transmission if contact were to occur. Considering that there would be no spatial and temporal overlap between pack goats and occupied core native bighorn sheep habitat, and that implementation of mitigation measures would further reduce the risk of contact between bighorn sheep and pack goats along with disease transmission if contact were to occur, the effects of this alternative on core native bighorn sheep herds would be similar to those described for Alternative 2.

Domestic goat packing would continue to occur within habitat for the Temple Peak herd because bighorn sheep in this cooperative review area are a lower priority for management by the WGFD. The effects of this alternative on the Temple Peak bighorn sheep herd would be the same as those described for Alternative 3.

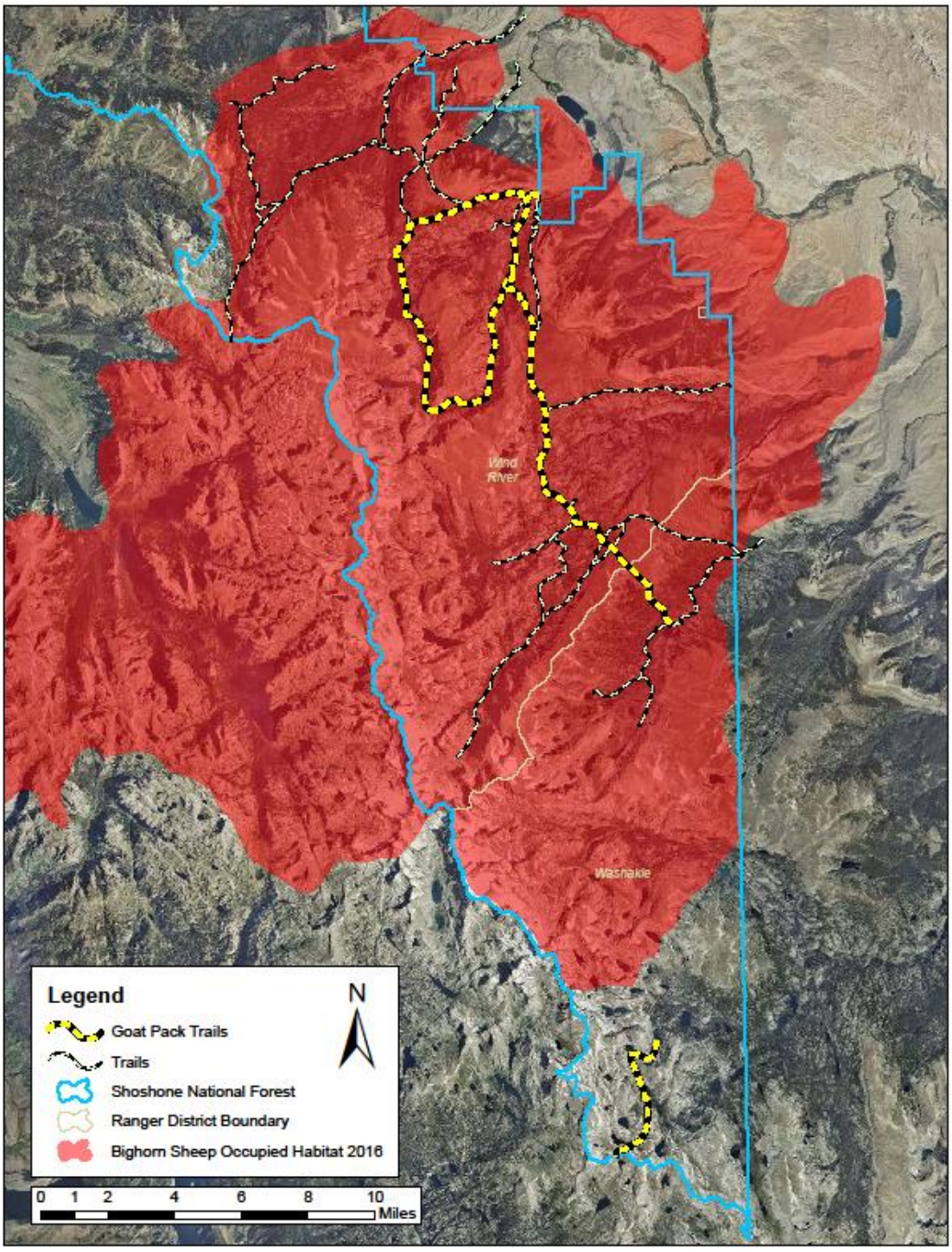

Figure 2. Trails used for goat packing prior to the 2011 and 2016 closure orders within the habitat occupied by the Whiskey Mountain bighorn sheep herd on the Wind River Ranger District

Cumulative Effects

Four of the six core native herds on the SNF are potentially within 35 km of domestic sheep that are on lands adjacent to the Forest (Table 3). The closest potential domestic sheep/goat grazing on public lands to the Trout Peak herd is about 19 km (12 miles) east on Bureau of Land Management lands. The closest potential domestic sheep/goat grazing on public lands to the Wapiti Ridge herd is about 29 km (18 miles) east on Bureau of Land Management lands. The closest potential domestic sheep/goat grazing on public lands to the Younts Peak herd is about 42 km (26 miles) east on Bureau of Land Management lands (Table 3). However, those potential sheep grazing sites are separated from these herds by miles of unsuitable bighorn sheep habitat as well as by Highway 120 (McWhirter, WGFD, pers. comm. 2017), and therefore the risk of contact and disease transmission to bighorn sheep in these areas is lower.

Domestic sheep grazing on adjacent lands is more of a concern for the Clarks Fork and Francs Peak herds. The closest domestic sheep/goat grazing to the Clarks Fork herd is about 2 km (1 mile) east on private lands. Recently domestic sheep grazing has occurred on private lands in Owl Creek within habitat of the Francs Peak herd. However, the Wyoming Wild Sheep Foundation and the individual landowner in question have recently cooperated to develop water sources at lower elevations (33 km from occupied sheep habitat) to reduce the need to graze domestic sheep in closer proximity to occupied bighorn sheep habitat (McWhirter, WGFD, pers. comm. 2017) which should help reduce the risk of contact and disease transmission to the Clarks Fork and Francs Peak herds.

In the recent past, the closest domestic sheep grazing on public lands to the Whiskey Mountain herd was about 10 km (6 miles) west on the BTNF. However, those allotments were recently closed to sheep grazing (USDA Forest Service 2017b). As a result, no known domestic sheep grazing occurs within 35 km of this herd, either on the SNF or BTNFs. The closest domestic sheep grazing on lands outside of the SNF to this herd is more than 60 km away on the BTNF. There have not been any active domestic sheep or goat grazing allotments on the Wind River Reservation within this herd's home range for at least several decades, and there are no known small hobby or farm flocks of domestic sheep or goats (P. Hnilica, U.S. Fish & Wildlife Service, personal communication 10/2/2017). There are no domestic sheep or goat grazing allotments on the Wind River Reservation within the Temple Peak bighorn sheep herd's range. There has been a small hobby flock of domestic sheep on the North Fork Popo Agie River near the Wind River Reservation boundary in the recent past, and a small flock of domestic sheep at low elevation on the Wind River Reservation along Trout Creek whose current status is unknown (P. Hnilica, U.S. Fish & Wildlife Service, personal communication 10/2/2017).

Pack goat use would still occur within occupied habitat for the Whiskey Mountain bighorn sheep herd on adjacent BTNF lands, and there would be some risk of contact and disease transmission from pack goats to bighorn sheep as a result.

The potential presence of domestic sheep on lands outside the jurisdiction of the SNF, yet still within the 35 km foray distance of bighorn sheep, adds to the risk of contact between bighorn sheep on the SNF and domestic sheep grazed on lands outside of the SNF. Such incidents originating from lands adjacent to, but outside the jurisdiction of, the SNF increase the likelihood of contact with domestic sheep and increase the risk of disease transmission to these herds.

Determination of Effects and Rationale for the Determination on Bighorn Sheep

Based on this analysis, it is determined that all alternatives "**may impact individuals, but are not likely to cause a trend to federal listing or a loss of species viability on the planning area**." The rationale for this determination is as follows:

- Alternative 1: No domestic sheep grazing would occur within proximity to any of the core native bighorn sheep herds. Two domestic sheep grazing allotments on the Washakie Ranger District are closer to potential habitat for the Temple Peak herd, but there is currently low risk of contact and little potential for disease transmission to this herd. In the unlikely event that disease transmission and a die-off of the Temple Peak Herd were to occur, it would not affect the overall viability of bighorn sheep across the Forest. The six core native herds total 4,550 animals, have high viability due to their large population size and large area of high-quality occupied habitat, and there is very little risk to these herds from domestic sheep grazing on the Forest. There would be spatial and temporal overlap between pack goats and all bighorn sheep herds on Shoshone National Forest lands under Alternative 1. The RADT analyzed the risk of contact and potential for disease transmission from pack goats to bighorn sheep, and concluded there would be potential for disease transmission, but that the risk would be relatively low. Even considering the uncertainty associated with this assessment, multiple transmission events resulting in multiple catastrophic all-age die-offs of multiple core native herds would have to occur in order to threaten the viability of bighorn sheep across the SNF, and it is very unlikely that this would result from pack goat use under this alternative.
- Alternative 2: The effects of domestic sheep grazing on SNF lands in relation to population viability of bighorn sheep across the Forest would be the same as those described for Alternative 1. The risk of contact between pack goats would be low with very little disease transmission risk and low uncertainty regarding that risk.
- Alternative 3: The overall potential for disease transmission between pack goats and bighorn sheep if contact were to occur would be lower compared to Alternative 1. However, there would still be substantial uncertainty associated with the potential for disease transmission to occur resulting in a bighorn sheep pneumonia die-off due to uncertainty regarding the efficacy of the mitigation measures.
- Alternative 3b: The effects of domestic sheep grazing on SNF lands in relation to population viability of bighorn sheep across the Forest would be the same as those described for Alternative 1. The effects to core native bighorn sheep herds from pack goat use would be similar to those described under alternative 2, given that there would be no spatial and temporal overlap between pack goats and occupied bighorn sheep habitat, and that implementation of mitigation measures would further reduce the risk of contact between bighorn sheep and pack goats along with disease transmission if contact were to occur. The mitigation measures required under this alternative would help reduce the risk of contact and disease transmission from pack goats to bighorn sheep in the Temple Peak herd compared to Alternative 1, although there would be uncertainty regarding the efficacy of the mitigation measures.

Recreational Pack Goat Use

Affected Environment

Pack goat use has typically occurred across wilderness areas of the United States in support of recreational activities to carry supplies or in the retrieval of big game. The Absaroka Range on the Wind River Ranger District and north across the remainder of the Shoshone National Forest have not been considered practicable areas for pack goat use because of large areas of core native bighorn sheep habitat and the potential for grizzly bear conflicts (C. Jennings, pers. comm., February 2, 2011). Use on the Shoshone National Forest has generally been on the Washakie Ranger District and portions of the Wind River Ranger District, overlapping with the Whiskey Mountain core native bighorn sheep herd and the Temple Peak cooperative review herd. Currently known use is by recreational pack goat enthusiasts and there is no authorized outfitter and guide use.

Direct and Indirect Effects

Alternative 1: No Action

Alternative 1 would have no prohibition on pack goat use across the Shoshone National Forest. If the No Action alternative was selected, the current forest order prohibiting pack goat use would expire. As result there would be no impacts to recreational pack goat use.

Alternative 2: Proposed Action

Alternative 2 would limit pack goat use to areas outside core native bighorn sheep habitat (Figure 3 in Appendix A), limiting use to the portion of the Washakie Ranger District outside of the Fitzpatrick Wilderness, overlapping only the Temple Peak cooperative review herd. Impacts to outfitters would be minimal considering the only pack goat outfitter to operate in the area of the Whiskey Mountain and Temple Peak herds was bought out in 2007 and the associated pack goat use has since discontinued. Thus, there is no impact to outfitter and guide use of pack goats. Recreational pack goat use within the area of the Whiskey Mountain herd would be prohibited under the proposed action. Pack goat use in other core native herd areas has not occurred since 2011 because of a previous forest order banning their use. Additionally, the Absaroka Range on the Wind River Ranger District and north across the remainder of the Shoshone National Forest have not been considered by goat packers as practicable areas for pack goat use because of the potential for grizzly bear conflicts and to a lesser extent the large areas of core native bighorn sheep habitat (email from Charles Jennings to Joe Harper of Shoshone National Forest: "Re: Maps for goatpacking in the Wind River Range" on February 28, 2011). Considering this, impacts to recreational pack goat use would likely be concentrated to those areas of core native bighorn sheep habitat on the Wind River and Washakie Ranger Districts. However, individuals who may potentially utilize pack goats because of physical limitations and/or who wouldn't use other pack stock, such as horses or mules, for various reasons such as discomfort with and/or a concern for their safety around larger pack animals, would be precluded from some areas of the back country on the remainder of the Forest.

Alternative 3 and 3b: Pack Goat Use with Mitigations and Pack Goat Use with Mitigations Outside Core Native Bighorn Sheep Occupied Habitat

Under Alternative 3 pack goat use could be permitted in occupied native core bighorn sheep ranges through a permit system that would incorporate the mitigation measures described under alternative 3 that would reduce the risk of contact with bighorn sheep and minimize the potential for disease transmission.

Comparatively, under Alternative 3b, domestic pack goat use would be prohibited in occupied core native bighorn sheep habitat, but could be permitted outside occupied core native bighorn sheep habitat through a permit process that would incorporate the mitigation measures described for alternative 3b, which would help reduce the risk of contact with bighorn sheep and minimize the potential for disease transmission. Impacts to pack goat users would be associated with the need to acquire a permit for pack goat use and the implementation of the mitigation measures outlined in alternatives 3 and 3b. The effects to pack goat users from the permit process and the mitigation measures imposed under alternative 3 and 3b would be similar. Those effects would include the burden of obtaining a permit, whereas alternatives 1 and 2 have no requirement for a permit. Additional impacts would be the costs of disease testing and associated with ensuring each pack goat is uniquely identified (e.g. ear tags, collars or tattoos). However, Alternative 3b would have an additional impact on pack goat users because they would not have access to the occupied core native bighorn habitat and access to areas outside occupied core native habitat is limited to those areas described under alternative 3b. Individuals who would likely utilize pack goats because of physical limitations and/or who wouldn't use other pack stock, such as horses or mules, for various reasons such as discomfort with and/or a concern for their safety around larger pack animals, would be precluded from using pack goats in areas of the back country on the SNF not specifically permitted.

Cumulative Effects

Because of previous prohibitions on pack goat use on most of the Shoshone National Forest for about six years and the relatively low level of usage in comparison to other stock, such as horses and mules, the cumulative impact of a prohibition on pack goats or conditional use based on mitigations to pack goat users and recreational users as a broader group would be anticipated to be minimal.

Pack goat use is prohibited within Yellowstone and Grand Teton National Parks as well as within the John D. Rockefeller Jr. Memorial Parkway, all administered by the National Park Service. Conversely, pack goats are allowed on the Bridger-Teton and Custer Gallatin National Forests. Additionally, the Absaroka Range on the Wind River Ranger District and north across the remainder of the Shoshone National Forest have not been considered by goat packers as practicable areas for pack goat use because of the potential for grizzly bear conflicts and to a lesser extent the large areas of core native bighorn sheep habitat (email from Charles Jennings to Joe Harper of Shoshone National Forest: "Re: Maps for goatpacking in the Wind River Range" on February 28, 2011).Considering that and those areas remaining open within the Greater Yellowstone Area, the cumulative impact to pack goat enthusiasts would be concentrated to the loss of pack goat access to the Fitzpatrick Wilderness and within those previously mentioned areas administered by

the National Park Service. Because of the relatively low levels of use in comparison to other stock, such as horses and mules, the cumulative impact to recreational users as a broader group from either a prohibition on pack goat use or conditional use would be anticipated to be minimal.

Considering the relatively infrequent use by pack goat users, when compared to other backcountry travel, such as hiking, hunting, and outfitting and guiding, any impacts associated with goat packing to local economies would be relatively minimal. However, the loss of bighorn sheep, in the event of a large-scale die off associated with disease transmission from pack goats, and subsequent impacts to activities such as wildlife viewing and photography, hunting, outfitting and guiding would likely be noticeable to the economy at a local scale.

Short-term Uses and Long-term Productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). As declared by the Congress, this includes using all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans (NEPA Section 101).

Considering the potential risk of disease transmission, domestic sheep and domestic goat grazing as well as pack goat use on the Shoshone National Forest has the potential to impact long-term bighorn sheep productivity in six of the eight core native bighorn sheep herds in Wyoming, some of the largest core native Rocky Mountain bighorn sheep herds in the Contiguous United States consisting of over 4,500 bighorns.

Unavoidable Adverse Effects

There are unavoidable effects to pack goat users under alternative 2, alternative 3 and alternative 3b. Alternative 2 limits pack goat use to those areas outside core native bighorn sheep habitat, while alternatives 3 and 3b require pack goat users to go through a permitting process in order to use pack goats on the Shoshone. Additionally, alternative 3b limits pack goat use to specific areas outside occupied core native bighorn sheep habitat.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line rights-of-way or road.

Under the No Action alternative, there is a potential irreversible commitment of resources if bighorn sheep were extirpated from those core native habitat areas on the Shoshone National Forest by transmission of disease.

Alternative 2, alternative 3 and alternative 3b would not be anticipated to result in irreversible or irretrievable commitment of resources because these would be administrative decisions that could be revisited at any time through the NEPA process and potentially reversed if new information and subsequent analysis supported such a decision.

Other Required Disclosures

NEPA at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders."

This document is a Supplement to the Final Environmental Impact Statement (FEIS) prepared for the Shoshone National Forest Plan Revision published in May 2015. There are no required disclosures other than those identified in Chapter 3 of the FEIS of May 2015. That section is hereby incorporated by reference and can be reviewed on the webpage for the Shoshone National Forest Land Management Plan.

Chapter 4. Consultation and Coordination

Preparers and Contributors

The Forest Service consulted the following individuals, Federal, state, and local agencies, tribes, and non-Forest Service persons during the development of this environmental assessment:

Interdisciplinary Team Members

- Casey McQuiston, Shoshone National Forest, Resources Staff Officer
- Andy Pils, Shoshone National Forest, Forest Wildlife Biologist
- James Wilder, Shoshone National Forest, Forest Wildlife Biologist
- Christopher Wehrli, Rocky Mountain Regional Office, Regional Environmental Coordinator
- Rick Truex, Rocky Mountain Regional Office, Regional Wildlife Program Manager

Federal, State, and Local Agencies

- Wyoming Game and Fish Department
- USDA Agricultural Research Service

Distribution of the Environmental Impact Statement

This EIS has been distributed to individuals who specifically requested a copy of the document. In addition, copies have been sent to Federal agencies, federally recognized tribes, state and local governments. The "List of Agencies for Distribution of Draft and Final Environmental Impact Statements" is available for download as an Excel spreadsheet on the Forest Service NEPA website. The SDEIS was sent to the following:

- Jessica Crowder – Office of Governor Matthew H. Mead
- Kevin Hurley – Wild Sheep Foundation
- Andrew Irvine
- Charles Jennings – North American Packgoat Association
- Steve Kilpatirck – Wyoming Wild Sheep Foundation
- Doug McWhirter – Wyoming Game and Fish Department
- William Meyers – Holland and Hart, LLP
- Jean Public
- Irene Saphra
- Ronald Smith – Bighorn Restoration Group
- Idaho Wool Growers Association
- U.S. EPA, Region 8
- Wyoming Department of Agriculture

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Appendix A. Maps of Pack Goat Areas

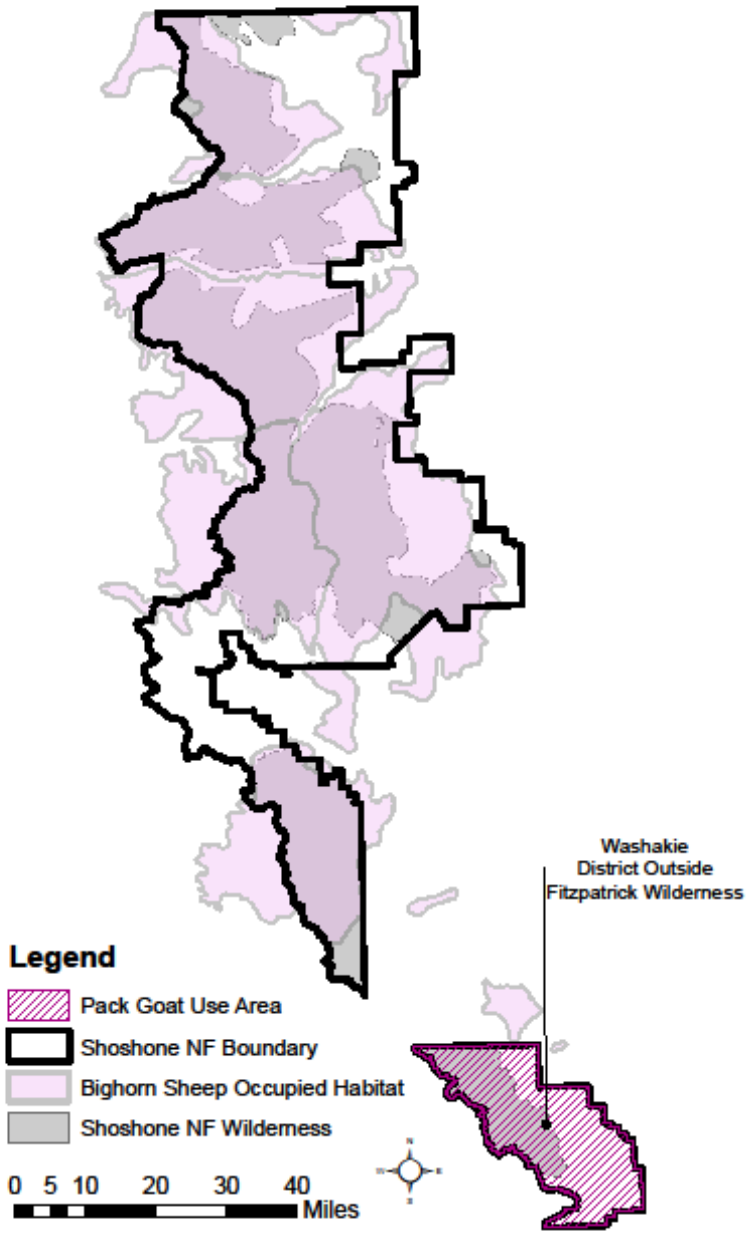

Figure 3. Overview of pack goat areas for Alternative 2

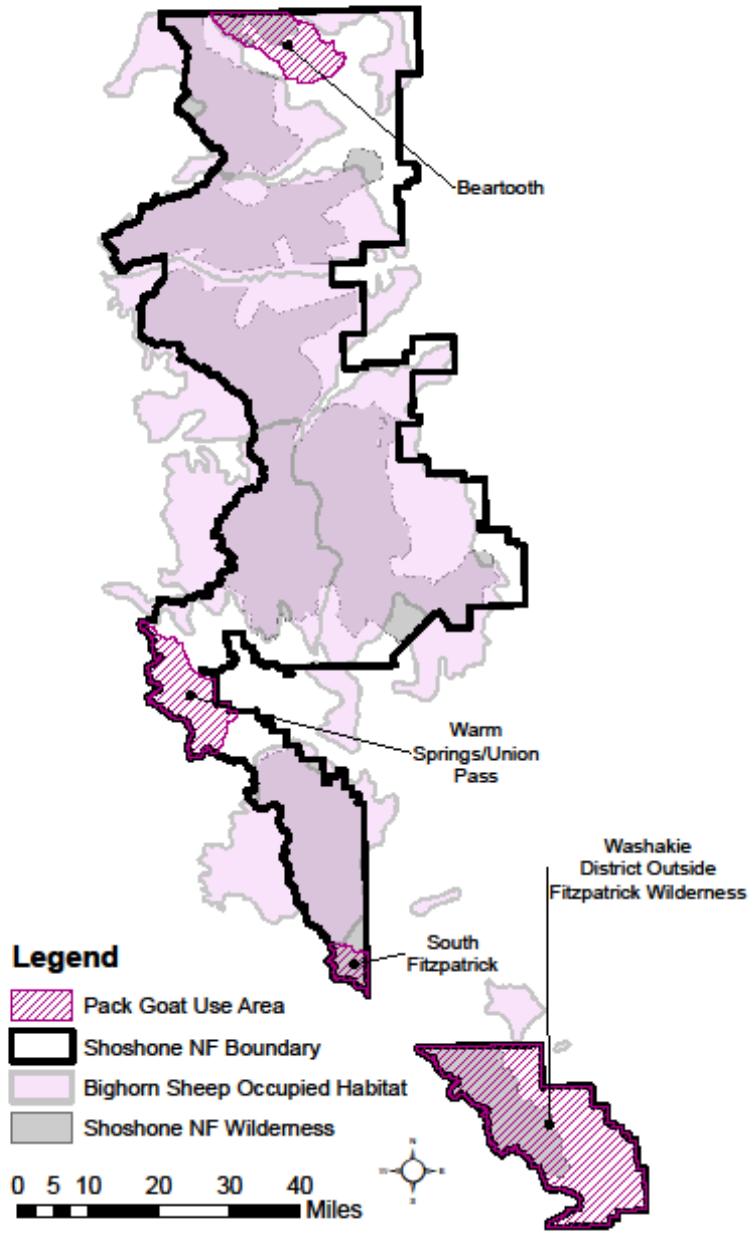

Figure 4. Overview of pack goat areas for Alternative 3b

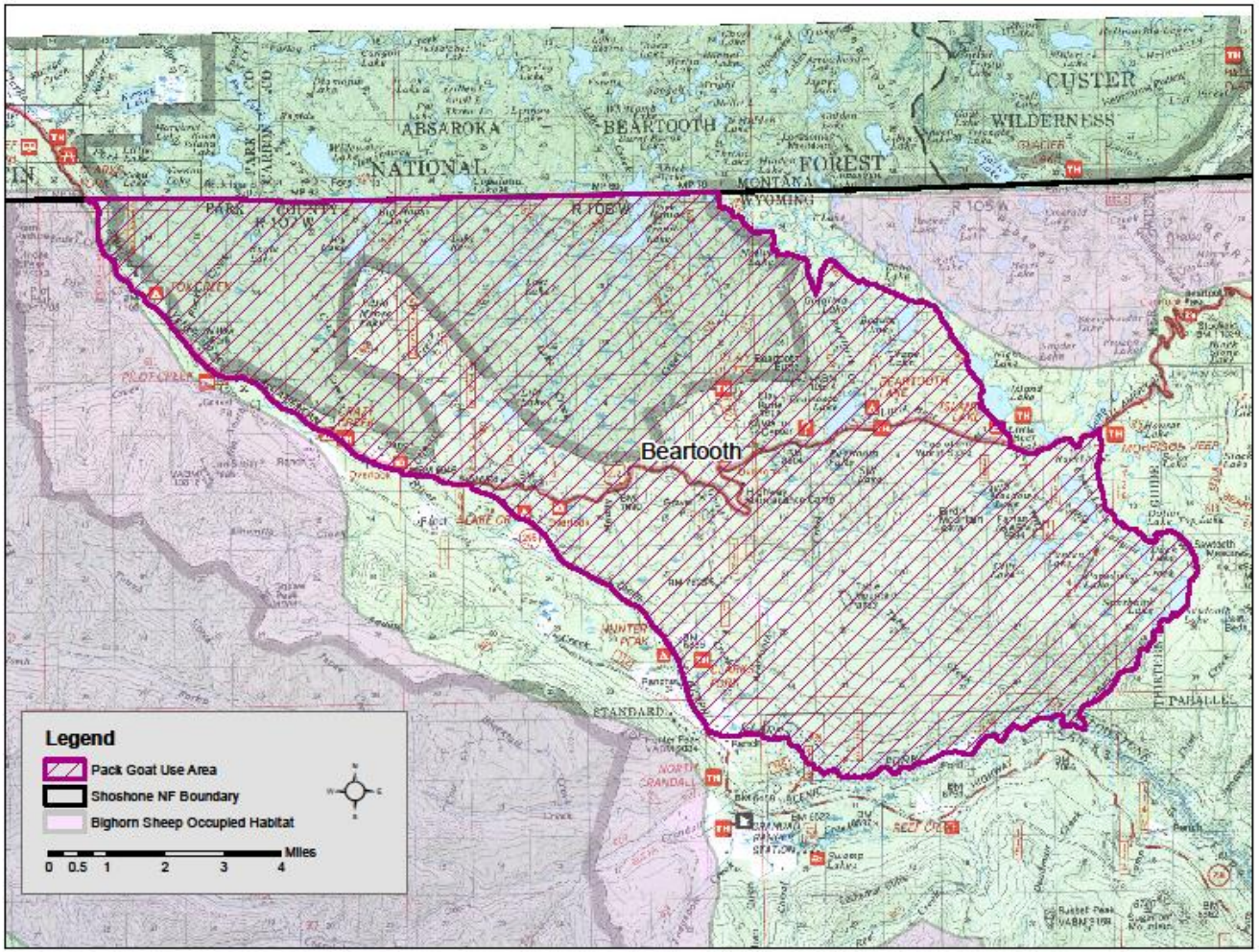

Figure 5. Beartooth pack goat areas

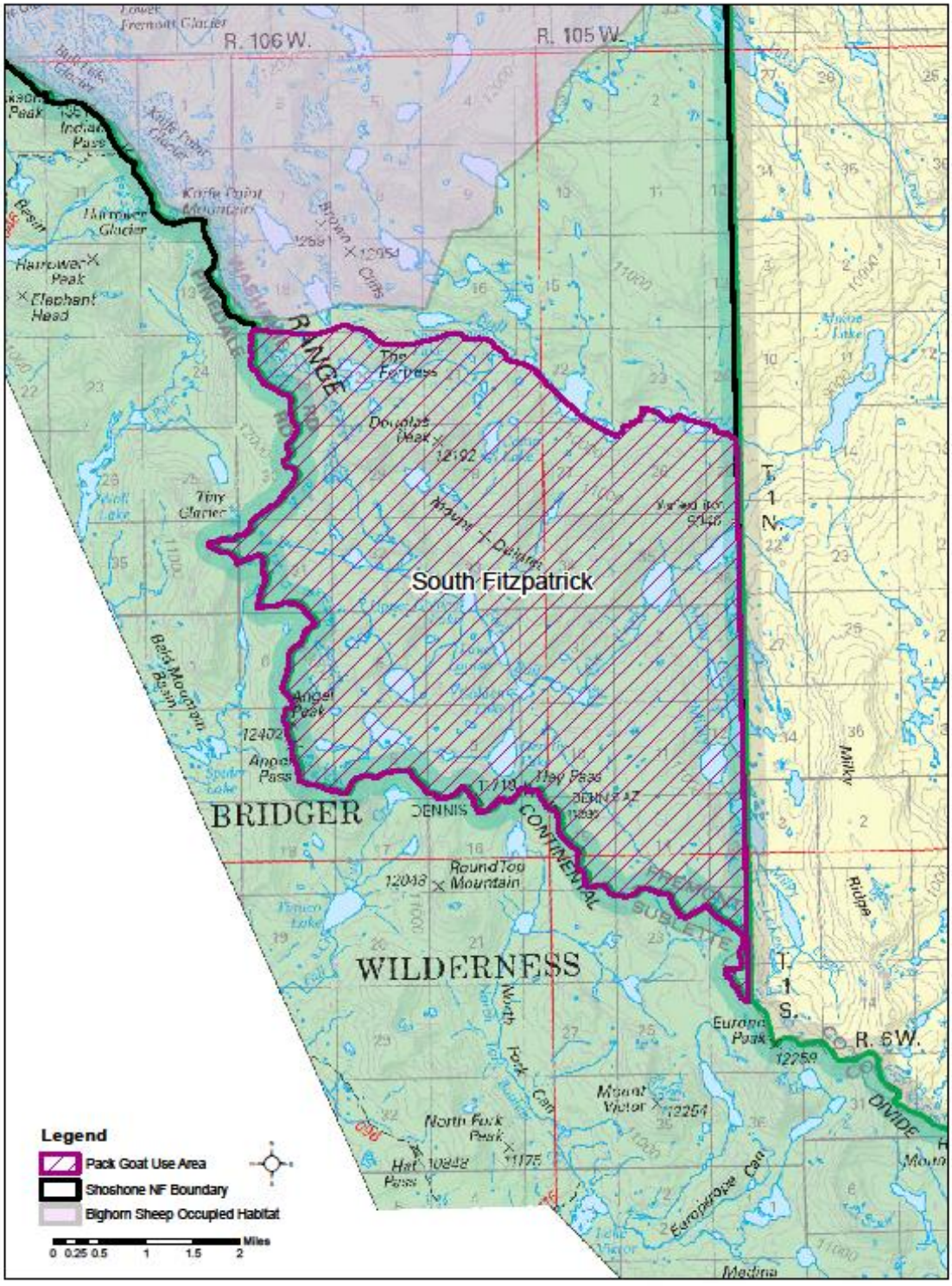

Figure 6. Fitzpatrick pack goat areas

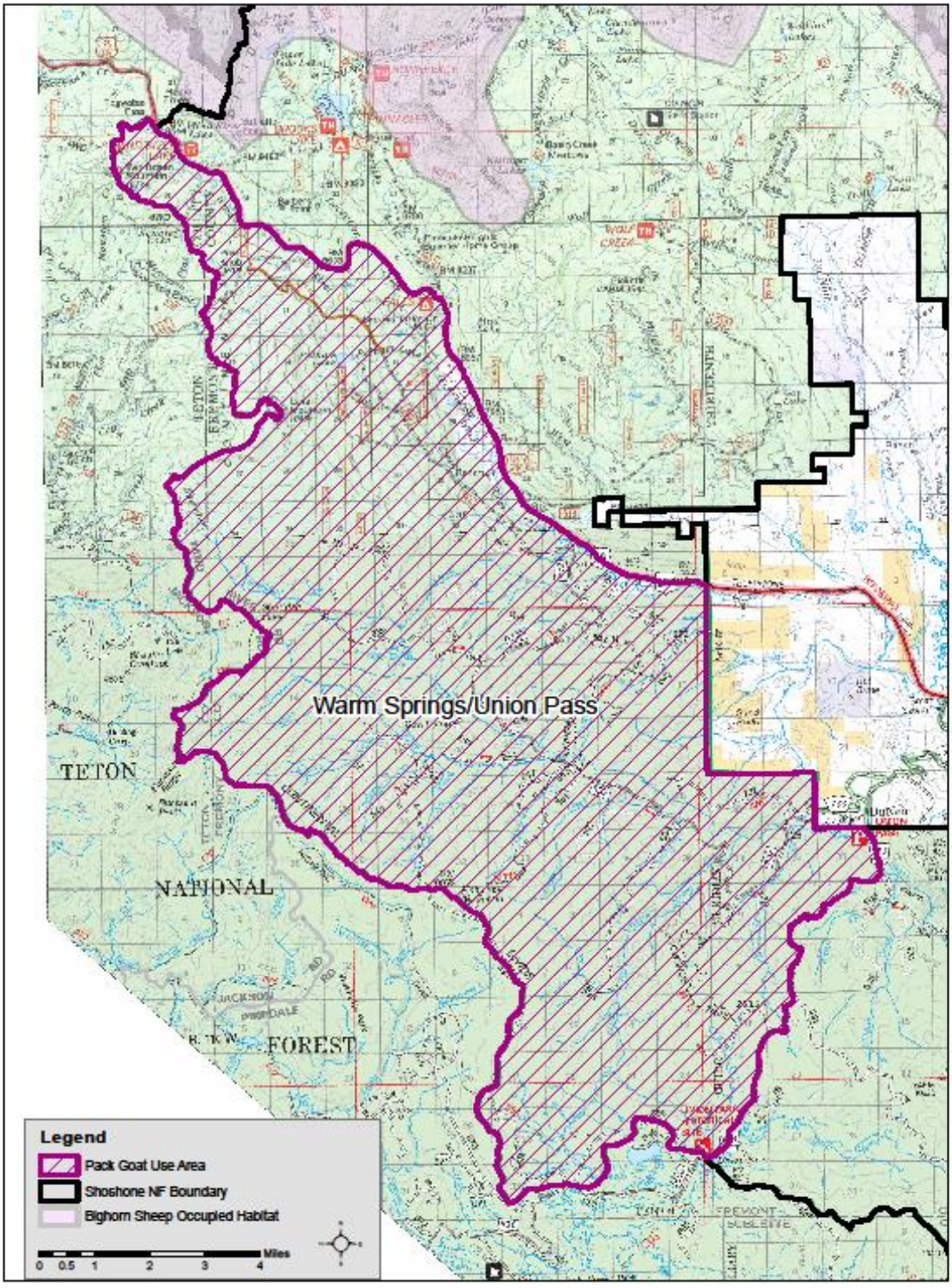

Figure 7. Warm Springs Union Pass pack goat areas

Appendix B. Response to Comments

Public involvement is critical in shaping public land management policy. Public comments ensure a Federal proposal is designed that not only meets agency missions and legal mandates, but addresses the interests of the American public. NEPA and the Council on Environmental Quality regulations require that lead agencies evaluate comments received from persons who review DEISs and prepare a written response. This appendix is a summary of the substantive public comments received on the SDEIS for the Use of Domestic Sheep, Goats, and Pack Goats of Land Management Plan Revision and the responses to those comments.

This appendix briefly describes the process for collecting and responding to the public comments received. Comments included in this appendix are those determined to be relevant to the decision to be made, as described in the *Decision Framework* section of the SFEIS, or were useful in clarifying and improving the analysis presented in the SEIS. Comments were consolidated and paraphrased for brevity in this appendix.

The following sections in this appendix describe the public involvement and content analysis process in greater detail. The comment database used to develop this appendix is in the SEIS record at the Shoshone National Forest's Office in Cody, WY and is available electronically. All public comments received are available online at: https://www.fs.usda.gov/detail/shoshone/landmanagement/planning/?cid=FSEPRD540949

Content Analysis Process

The SDEIS 90-day comment period opened on Friday, May 12, 2017, and closed on Thursday, August 10, 2017.

Within the 90-day comment period, a total of 54 letters were received. Of these letters:

- Number of designated as unique letters: 54
- Number designated as duplicate submissions: 0
- Number designated form/form plus letters (a form letter with an additional comment): 5 Form / 3 Form+

After the comment period closed on August 10, 2017, five additional letters were received, including an Alternative submitted by a group of stakeholders.

Concerns raised by different commenters on the same subject and with the same intent were grouped, capturing the essence of like-concerns. The content analysis process ensured that every comment was read, analyzed, and considered.

It is important to recognize the consideration of public comment is not a vote-counting process in which the outcome is determined by the majority opinion. Relative depth of feeling and interest among the public can serve to provide a general context for decision-making. However, it is the appropriateness, specificity, and factual accuracy of comment content that provide the basis for modifications to planning documents and decisions.

Further, because respondents are self-selected, they do not constitute a random or representative public sample. The Forest Service encourages all interested parties to submit comments as often

as they wish, regardless of age, citizenship, or eligibility to vote. Respondents include Federal, State, local, and Tribal governments; organizations or public interest groups; businesses; people from other countries; and people who submitted multiple responses. Therefore, caution should be used when interpreting comparative terms in the *Response to Comments* section (Appendix A). Every substantive comment and suggestion has value, whether expressed by one respondent or many.

State and Federal Agency Commenters

The following is a list of State and Federal agencies that submitted a letter regarding this project. The EPA comment letter is included. The list is organized alphabetically, by agency.

- Environmental Protection Agency
- State of Wyoming – Office of the Governor
- Wyoming Department of Agriculture
- Wyoming Game & Fish Department

Organization Commenters

Organizations that submitted letters regarding this project are listed alphabetically in Table 4, along with the city and state of the organization.

Table 4. Organization commenters

Organization Name	City	State
Bighorn Restoration Group	Lander	WY
North American Packgoat Association	Jackson	WY
Western Watersheds Project	Hailey	ID
Wild Sheep Foundation	Bozeman	MT
Wyoming Farm Bureau Federation	Laramie	WY
Wyoming Livestock Board	Cheyenne	WY
Wyoming Wild Sheep Foundation	Moose	WY
Wyoming Wool Growers Association	Casper	WY

Forest Service Response to Comments

The public concern statements that have been addressed in this appendix are considered to be comments of a substantive nature. A substantive comment does one or more of the following:

- questions, with a reasonable basis, the accuracy of the information and/or analysis in the SDEIS,
- questions, with a reasonable basis, the adequacy of the information and/or analysis in the SDEIS,
- presents reasonable alternatives other than those presented in the SDEIS that meet the purpose and need of the proposed action and addresses significant issues,

- questions, with a reasonable basis, the merits of an alternative or alternatives,
- causes change in or revisions to the proposed action, or
- questions, with reasonable basis, the adequacy of the planning process itself.

Consistent with 40 Code of Federal Regulations (CFR) 1503.4(b), all substantive comments received a response. The Forest Service is not required to respond to non-substantive comments. Although every comment was carefully considered and reviewed, non-substantive comments did not receive a detailed response. A non-substantive comment is categorized as one of the following:

- general comment, opinion, or position statement,
- concern that is outside the scope or irrelevant to the propose action and decision,
- means of addressing the concern are already decided by law, regulation, or policy,
- concern can be better addressed through another decision process (e.g., project-level analysis), or
- concern requests action that has already been considered in an alternative.

After completion of the content analysis, public concerns statements were given to members of the interdisciplinary team to develop responses and are presented in this appendix. As described in the *Content Analysis Process* section, each public concern statement was derived from one or many individual public comments. The interdisciplinary team reviewed both the public concern and the supporting comments in the preparation of the responses. A response may be general or contain specific details that address a particular comment associated with the public concern.

Law, Regulation, and Policy Compliance

Comment: BRG has been exceedingly troubled with the SNF's noticeable callous indifference, apparent neglect of, and conspicuous dismissal of the importance of the TPBSH as presented in the SDEIS. U. S. Forest Service and SNF policy lists bighorn sheep as a "sensitive species" on the Forest. Our organization strongly believes that the more than 120 individuals in the TPBSH herd (not counting lambs born this spring) should be treated as such.

> **Response:** Forest Service manual direction requires that the agency maintain viable populations of native species across the planning unit (i.e., National Forest). The Biological Evaluation made effects determinations relative to this requirement for each SEIS alternative, as required by Forest Service manual direction. The Temple Peak bighorn sheep herd (TPBSH) was included in the Biological Evaluation analysis.

Comment: The Forest Service here failed to analyze the effects of eliminating all domestic sheep and goats, including pack goats, from areas likely to be used by bighorn sheep. After more than 40 years of intensive restoration efforts across the West, bighorn sheep populations remain at less than 10% of estimated presettlement numbers, with herds facing ongoing population-limiting pneumonia outbreaks and increasing levels of human disturbance and habitat degradation. The exclusion of pack goats from all bighorn occupied habitat and the closure of the remaining sheep allotments is necessary to meet the Forest Service's obligation to protect sensitive native species, and would be reflect the species' status as treasured component of the natural heritage of the West.

Response: Forest Service manual direction requires that the agency maintain viable populations of native species across the planning unit (i.e., National Forest). The Biological Evaluation made effects determinations relative to this requirement for each SEIS alternative, as required by Forest Service manual direction.

Comment: From a management perspective, Forest Service Manual ("FSM") sections 2670.32 and 2672.1 direct the Shoshone NF to avoid or minimize impacts to species listed by the Regional Forester as a sensitive species. Rocky Mountain bighorn sheep are designated as such a species on the Shoshone NF. See RADT Report at 1. Further, as described in FSM 2672.4 and based on the above, analyzing and disclosing the potential effects of cattle grazing and use on bighorn sheep is needed to meet Forest Service direction for sensitive species management.

Response: Allocation of cattle grazing allotments is beyond the scope of this decision to be made, because that decision has already been made as part of the 2015 Forest Plan decision.

Comment: The Shoshone NF's Closure of the Forest to Goatpacking Has Not Been "Temporary" and Has Thus Been Implemented Unlawfully. The Shoshone NF also provides on page 12 of the RADT Report that there has been a "temporary" area closure restricting packgoat use on the Forest since November 14, 2011. The Shoshone NF's use of a "temporary" closure to restrict packgoat use on the Shoshone NF for the last six years without preparing an environmental analysis or environmental impact statement under NEPA studying such major federal action is a violation of NEPA.

Response: Beginning November 14, 2011, the Shoshone issued a temporary restriction on pack goat while Forest Plan revision was in progress. After the Forest Plan Record of Decision was signed May 6, 2015 a new closure order was issued to update the restriction which has remained in effect while the Forest prepares the SEIS.

Comment: BRG has been exceedingly troubled with the SNF's noticeable callous indifference, apparent neglect of, and conspicuous dismissal of the importance of the TPBSH as presented in the SDEIS. U. S. Forest Service and SNF policy lists bighorn sheep as a "sensitive species" on the Forest. Our organization strongly believes that the more than 120 individuals in the TPBSH herd (not counting lambs born this spring) should be treated as such.

Response: Forest Service manual direction requires that the agency maintain viable populations of native species across the planning unit (i.e., National Forest). The Biological Evaluation made effects determinations relative to this requirement for each SEIS alternative, as required by Forest Service manual direction. The Temple Peak bighorn sheep herd was included in the Biological Evaluation analysis.

Comment: It must recognize the importance of maintaining healthy populations as source stock for transplants, to colonize unoccupied historic habitat, and for scientific study, and it must follow USFS Sensitive Species policies, which make no distinction between reintroduced and remnant populations.

Response: Authority for transplanting bighorn sheep is with the Wyoming Game & Fish Department. Forest Service manual direction requires that the agency maintain viable populations of native species across the planning unit (i.e., Shoshone National Forest). The Biological Evaluation made effects determinations relative to this requirement for each

SEIS alternative, as required by Forest Service manual direction. All alternatives would be in compliance with Forest Service policy for management of sensitive species.

Comment: Pack goat use is not addressed in the Wyoming Plan. However, the process of working together on management solutions is an integral part of the Wyoming Plan. The Shoshone National Forest should work with the Wyoming Game and Fish Department, the Wyoming Department of Agriculture, pack goat interests and bighorn sheep interests to develop a final decision that takes into account the expertise, input and concerns of these groups.

Response: The State of WY, Department of Game and Fish is a Cooperating Agency with expertise in bighorn sheep management. The Shoshone National Forest has considered all of the relevant information provided throughout the analysis process and will be considered in for the final decision.

Scientific Understanding of Disease Transmission/Best Available Science

Comment: Throughout the SDEIS it commonly refers to all this "supportive evidence" that Mycoplasma ovipneumonia (commonly referred to as "Movi") can be transmitted to bighorn sheep causing death. While this may be true, this "evidence" that is commonly referred to is that of the domestic sheep. Pack goats and domestic sheep are COMPLETELY different. In fact, even feral goats are not to be compared to pack goats.

Response: The final RADT discloses the evidence regarding the potential for disease transmission between domestic sheep, domestic goats, and pack goats, and bighorn sheep. The final RADT was revised and acknowledges that the science linking disease transmission from domestic goats to bighorn sheep is not as extensive as the evidence for domestic sheep. It also discusses emerging evidence that pack goats may be less of a disease transmission risk than other types of goats.

Comment: Take for instance the Hells Canyon deal, first and foremost, there was NOTHING to support the belief that these feral goats were the cause of pneumonia being spread to the bighorn sheep. I have attached a response written by the president of NAPgA, Charles Jennings, he has some good points to the paper Rudolf wrote about the Hells Canyon deal. Throughout the article that Rudolf wrote she openly admits, and I quote, "there is not evidence that those organisms were associated with subsequent disease or death." In fact, the only finding from that study was that the feral goat and the bighorn sheep in direct contact with it shared similar Pasteurella bacteria; I have also attached a response in regards to Rudolph's paper on Hells Canyon written by Dr. Maggie Highland based solely on scientific facts, I believe she sums it up perfectly stating, "Exaggeration and over interpretation of data has no place in science and it is inhibitory to problem solving."

Response: The final RADT acknowledges that there is scientific debate over the Hells Canyon incident, where feral goats were identified by some investigators as being the potential source of disease that led to a bighorn sheep die-off.

Comment: Dr. Besser's 2015 study (WSU) of comingling clean domestic goats with clean (M-ovi free) Bighorn Sheep for 100 days is absolutely a scientific study the proves that clean domestic goats are not a disease threat to Bighorns or other wildlife.

Response: The Forest Service believes the 2015 study referred to in this comment is the same study as was published in June 2017 by Dr. Besser and others after the release of the draft SEIS. The results of this 2017 study do not conclusively prove that domestic goats do not pose a disease transmission risk to bighorn sheep. The study demonstrated that bighorn sheep comingled with domestic goats testing positive for M. ovipneumoniae developed pneumonia, although the severity of the disease was notably milder than that seen in similar experiments involving domestic sheep strains of the bacterium. The RADT also includes a discussion of important unresolved questions brought forth in this study regarding disease transmission risk from domestic goats, highlighting the scientific uncertainty that still exists on this topic.

Comment: Misinterpreted information of best available Science. 2004 Silver Bell Mountains Bighorn Sheep herd north/west of Tucson AZ. Over four thousand BRUSH Clearing Feral Goats (not pack goats) are dropped into an allotment near the Silver Bell Heard. After an exhausting 60+ day effort by AZ Department of Fish and Game to remove the Brush Goats comingling with the Bighorns the only infection transmission that occurred was Pink Eye (conjunctivitis). See the Jim Heffelfinger study Arizona Game and Fish.

Response: The RADT referred to the animals involved in the Silver Bell Mountain incident as "domestic goats" and did not imply that they were pack goats. It also stated that the disease transmission which occurred in this incident was pink eye.

Comment: Can we blame just one pathogen?

Response: The RADT discusses several pathogens which are of concern for bighorn sheep as it relates to the potential for disease.

Comment: The latest available science I have reviewed has not shown that goats are a threat to bighorn sheep; especially with respect to Mycoplasma ovipneumoniae (Movi), the main health concern when it comes to wild sheep.

Response: The final RADT discusses several pathogens that have been identified as causal agents for bighorn sheep pneumonia, and discloses that there is scientific debate over the relative importance of these.

Comment: The data also clearly shows that grouping domestic goats, especially pack goats, with domestic sheep and labeling them both as a high risk to bighorn sheep is simply inaccurate.

Response: The final RADT was revised to include emerging science indicating that domestic goats and pack goats may present a lower risk of disease transmission than domestic sheep. The risk ratings presented in the RADT and SEIS were used to assess risk of contact between pack goats and bighorn sheep, and disease transmission risk was evaluated considering this rating.

Comment: Scientific knowledge is continuing to grow. Is current research being fully considered?

Response: The Forest Service acknowledges that scientific knowledge regarding disease transmission between domestic sheep, goats, and pack goats and bighorn sheep is continuing to grow. The RADT and SEIS are fully considering current research. For example, the RADT was revised to incorporate a study published by Dr. Besser and others in June 2017, as well as unpublished research from Dr. Highland.

Comment: However, a recent study, conducted by Dr. Margaret Highland, veterinary researcher with the USDA, found that there was a much lower level of disease-causing bacteria than previously thought. 99.47% of goats of packable age were not detected having MOVI (M. ovipneumoniae).

Response: The final RADT discussed the preliminary results of Dr. Highlands's research.

Comment: The conclusion of the study was that domestic goats that are already infected with lungworms could infect bighorn sheep that share a pen and bed together for 11 months. Id. On the Shoshone NF, however, the concerns over bighorn sheep die-offs are not tied to lungworms, so this conclusion is of little value for the RADT Report and SDEIS and certainly does not support the assumption that packgoats transmit Pasteurella spp. or other respiratory disease to bighorn sheep on the Shoshone NF.

Response: See response to comment 277. The study is relevant because the authors conclude that transmission of lungworm from domestic goats may predispose bighorn sheep to development of pneumonia. The final RADT discloses the evidence regarding the potential for disease transmission between domestic sheep, domestic goats, and pack goats, and bighorn sheep. The final RADT was revised and acknowledges that the science linking disease transmission from domestic goats to bighorn sheep is not as extensive as the evidence for domestic sheep. It also discusses emerging evidence that pack goats may be less of a disease transmission risk than other types of goats.

Risk Analysis of Disease Transmission (RADT)

Comment: Domestic Sheep and goats have been lumped together when it comes to this issue, but research has shown that they are very, very different.

Response: The final RADT discloses the evidence regarding the potential for disease transmission between domestic sheep, domestic goats, and pack goats, and bighorn sheep. The final RADT was revised and acknowledges that the science linking disease transmission from domestic goats to bighorn sheep is not as extensive as the evidence for domestic sheep. It also discusses emerging evidence that pack goats may be less of a disease transmission risk than other types of goats.

Comment: Even when Movi positive goats were comingled with bighorn sheep, the bighorn sheep did not get pneumonia or die (Besser-WSU, 2012 & 2016).

Comment: Dr. Besser's 2015 study (WSU) of comingling clean domestic goats with clean (M-ovi free) Bighorn Sheep for 100 days is absolutely a scientific study the proves that clean domestic goats are not a disease threat to Bighorns or other wildlife.

Response: The Forest Service believes the 2016 referred to in this comment is the same study as was published in June 2017 by Dr. Besser and others after the release of the draft SEIS. The results of this 2017 study and the 2012 study do not conclusively prove that domestic goats do not pose a disease transmission risk to bighorn sheep. The study demonstrated that bighorn sheep comingled with domestic goats testing positive for M. ovipneumoniae developed pneumonia, although the severity of the disease was notably milder than that seen in similar experiments involving domestic sheep strains of the bacterium. The RADT also includes a discussion of important unresolved questions

brought forth in this study regarding disease transmission risk from domestic goats, highlighting the scientific uncertainty that still exists on this topic.

Comment: The Risk Analysis assumes that at least one contact between pack goats and bighorn sheep would occur per year, which would equate (by the Shoshone's definition) of 100% probability of contact. Please provide the rationale AND documentation behind this assumption (Page 22-23, likelihood of contact between pack goats and bighorn sheep).

Response: An updated analysis of risk of contact between pack goats and bighorn sheep was provided in the final RADT and SEIS, along with an updated analysis of disease transmission risk. A qualitative method was used, and the rationale was provided. There was no assumption of 100% probability of contact used, and language regarding this assumption along with references to the use of the risk of contact model were removed from the final RADT to clarify this.

Comment: The decisions you are making is based on 100% contact frequency, and that is so far statistically, from what is even possible, the decision needs to stop right at that very fanciful fact.

Response: The risk of contact model was not used to determine the risk of contact ratings for pack goats, and language regarding the assumption of one contact per year between pack goats and bighorn sheep was removed from the final RADT. Instead, a qualitative method was used.

Comment: if you assume a reasonable potential contact of maybe 1% and the less than 7% chance (based on Maggie Highlands most recent study) that one of those goats may be shedding Movi you now have such a low probability of disease transmission that the risk is negligible and almost unmeasurable at less than 1/8th of 1%.

Response: An updated analysis of risk of contact between pack goats and bighorn sheep was provided in the RADT and SEIS, along with an updated analysis of disease transmission risk. A qualitative method was used, and the rationale was provided.

Comment: In closing, I think pack goats are a negligible risk to bighorn sheep populations when you consider the minimal risk indicated by the latest available science coupled with heath inspections and some simple backcountry handling practices.

Response: The final RADT discloses the evidence regarding the potential for disease transmission between domestic sheep, domestic goats, and pack goats, and bighorn sheep. The final RADT was revised and acknowledges that the science linking disease transmission from domestic goats to bighorn sheep is not as extensive as the evidence for domestic sheep. It also discusses emerging evidence that pack goats may be less of a disease transmission risk than other types of goats.

Supplemental Draft Environmental Impact Statement

Comment: Additionally, I would also point out that statistically speaking, with Alternative 3 the risk of disease transmission from pack goat to bighorn sheep would be incredibly minute as follows:
*The most current research indicates an already extremely low incidence of Movi in pack goats & goats living with pack goats (2016 Goat Movi study, Dr. Maggie Highland, USDA - 94.8% free).

*Requiring a current disease test certificate in order to obtain a permit would lower this risk even further to virtually zero.
*Goats are herd animals that do not stray from camp; highlining reduces this straying risk from virtually zero to pretty much absolute zero :)

> **Response:** An updated analysis of risk of contact between pack goats and bighorn sheep was provided in the RADT and SEIS, along with an updated analysis of disease transmission risk. This analysis included the best available science, while recognizing that the amount of science available specific to pack goats is extremely limited. The updated RADT discussed the preliminary results of Dr. Highlands's research.

Comment: The SDEIS as now written-especially the preferred alternative (Alternative 2)-is not a win/win for all parties, nor does it meet the goal of the SDEIS of reducing the risk of transfer of disease between domestic livestock and wild bighorn sheep. In fact, the SDEIS' preferred alternative is a BIG LOSE for the Temple Peak Bighorn Sheep Herd (TPBSH), offering absolutely no concessions or protections for this bighorn sheep herd from the possible transfer of disease from domestic livestock in direct contradiction to the stated goal of the SDEIS and the win/win dynamics advanced at the July 28th public meeting.

> **Response:** The SEIS considered a range of alternatives that include management options from no restrictions on pack goat use to prohibiting pack goat use in core native bighorn sheep habitat. Alternative includes mitigation measures for pack goat use and would be implemented Forest-wide.

Comment: "BRG believes there are several statements made throughout the SDEIS that are likely erroneous and/or in need of being updated or corrected prior to the final EIS being published. They include:

1) On page 8 of the SDEIS is the following statement: ""Five of the six core native (bighorn) herds are connected to on another (Whisky mountain being the exception), and together form the Absaroka metapopulation."" On page 12 the SDEIS also states that: ""The Whisky Mountain herd is isolated from the other herds on the Shoshone Nation Forest.""

In fact, Whisky Mountain Bighorns regularly cross Highway 287/26 both near Jakey's Fork, near Red Rocks, and likely at several other locations. Individuals crossing the highway find themselves in the habitat of the so named ""Dubois Badlands Bighorn Herd."" The Dubois Badlands Bighorn Sheep, in turn, have been shown to then interact with both the Younts Peak Herd and Francs Peak Herd to the north. This fact has been well documented as far back as the 1960's and 1970's when the Wyoming Game and Fish Department Placed collars of various colors on diverse bighorn sheep sub-herds wintering in the Dubois area. Subsequent bighorn movement observations subsequently documented individuals traveling and interacting with individuals from both the Wind River Mountains and the Absaroka Mountains. "

> **Response:** Information on bighorn sheep herd units was obtained from the Wyoming Game & Fish Department, which is the agency that delineates herd units for this species. It is recognized that there is likely some level of interchange between the Absaroka metapopulation and the Whiskey Mountain herd in several locations. However, the WGFD has determined that the level of interchange is low enough to consider these to be separate herd units.

Comment: The Forest Service here failed to analyze the effects of eliminating all domestic sheep and goats, including pack goats, from areas likely to be used by bighorn sheep. After more than 40 years of intensive restoration efforts across the West, bighorn sheep populations remain at less than 10% of estimated presettlement numbers, with herds facing ongoing population-limiting pneumonia outbreaks and increasing levels of human disturbance and habitat degradation. The exclusion of pack goats from all bighorn occupied habitat and the closure of the remaining sheep allotments is necessary to meet the Forest Service's obligation to protect sensitive native species, and would be reflect the species' status as treasured component of the natural heritage of the West.

> **Response:** Forest Service manual direction requires that the agency maintain viable populations of native species across the planning unit (i.e., National Forest). The Biological Evaluation made effects determinations relative to this requirement for each SEIS alternative, as required by Forest Service manual direction.

Comment: It must include the full assessment of an alternative which would authorize no domestic sheep grazing on the allotments and no pack goat use within any occupied bighorn habitat.

> **Response:** The SDEIS documents the effects of pack goat use on the Shoshone National Forest. The RADT included consideration of domestic sheep, domestic goats, and pack goats, as required by the Stipulated Settlement Agreement. The scope of the analysis and decision to be made was identified in the SDEIS and is specific to the potential risk of contact between domestic sheep, domestic goats, and pack goats with bighorn sheep. The scope of the analysis is not to determine suitability or capability of domestic grazing on the Forest, that decision has already been made through a previous analysis and decisions process.

Comment: This action will affect our ranchers and outdoor enthusiasts' lives. Ranchers will be banned from allowing their sheep to graze at such cheap costs, resulting in a loss of income.

> **Response:** None of the alternatives considered would involve changes to domestic sheep grazing allotments on the Shoshone National Forest.

Comment: "Please explain the discrepancy between the following Goals (SDEIS pg 3 and SDEIS pg 6):

SENS-Goal-03— "Maintain LOW RISK of disease transmission from domestic sheep and domestic goats to wild bighorn sheep within core bighorn sheep ranges" (SDEIS pg 3) AND

SENS-Goal-03—"Maintain LOWEST POSSIBLE RISK of disease transmission from domestic sheep and domestic goats to wild bighorn sheep within core bighorn sheep ranges" (SDEIS pg 6).

Why are these two GOALS different from one another? There is a vast difference between LOW RISK and LOWEST POSSIBLE RISK. This confusion of terms raises the question of the actual intent and feasibility of the Proposed Action. Please explain this discrepancy or be consistent and correct with your goal statement."

> **Response:** The final SEIS was edited to correct the inconsistency.

Comment: "The Shoshone NF Misrepresents the Feasibility of Vaccines and Fails to Consider the Vaccination and Removal of M. ovi from Domestic Ruminants as a Strategy for Reducing Potential Disease Transmission to Bighorn Sheep.

The Shoshone NF provides the statement, "[s]o far no vaccine has completely protected wild sheep commingled with domestic sheep or goats in captive settings or shown potential for efficacy in free-ranging animals (Callan et al. 1991, Kraabel et al. 1998, Cassirer et al. 2001, Subramaniam et al. 2011, Sirochman et al. 2012)." RADT Report at 11. The reason the Shoshone NF has included "goats" in the above statement is unclear, considering that none of the references appear to be studies involving goats. The Shoshone should clarify which studies concern goats or otherwise remove "goats" from the above statement."

> **Response:** The statement referred to in this comment has been revised to clarify that the references apply to domestic sheep studies, not domestic goats.

Comment: Still, the statement appears to be inaccurate. Subramaniam et al. (2017) reported that previous studies concerning vaccines did not test vaccines specifically designed to protect against M. haemolytica. As a result, the study tested a vaccine designed to protect against M. haemolytica (Subramaniam et al. 2017). The vaccine was a success. "All controls died while 100% of vaccinated BHS survived the challenge with M. haemolytica A2" (Subramaniam et al. 2017).

> **Response:** Subramaniam et al. (2011) reported that the vaccine used in their study required repeated injections, and thus was not effective for use in free-ranging animals as indicated in the RADT.

Alternatives and Mitigation Measures

Comment: Pack goat use has been reported to BRG in the vicinity of the Cirque of the Towers and other areas where 2016/2017 GPS data show radio-collared bighorns from the TPBSH are summering. BRG therefore recommends that the "Best Management Practices" as defined by the NAPGA be required for all pack goat operations utilizing the Washakie Ranger District. These practices should be put in place as requirements of Washakie Ranger District pack goat permits.

> **Response:** Alternative 3 would require mitigation measures to be implemented for pack goat use Forest-wide, including within the occupied habitat of the Temple Peak bighorn sheep herd.

Comment: The North American Pack Goat Association (NAPGA) provided "additional mitigation measures" and yet these measures "were not considered…because they were not feasible to implement" (pg. 7). We assume if NAPGA volunteered these measures they considered them feasible. The FS must remember that the State Plan does not say "make risk of contact zero" - it intends to reduce the risk as much as possible through various mechanisms, including mitigation measures to reduce likelihood of contact.

> **Response:** The SEIS disclosed that the project record contains a discussion of mitigation measures considered not feasible to implement. Because of the complexity, some these mitigations were not considered feasible for the Forest Service to require but could be a recommended action under a permit system.

Comment: Engineering a permit user system for pack goat users will allow the forest service to have an up close and personal look at who and what is actually using the forest and it will provide for useful data collection.

> **Response:** Alternative 3 includes a list of mitigation measures proposed by the North American Packgoat Association of which includes: Implementing a system that would require a permit for all pack goat use. Pack goat users would be informed on required and recommended actions for reducing the risk of contact between pack goats and bighorn sheep when obtaining a permit. Further analysis is included in Chapter 3 of the SEIS.